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Bibliography on Extended Forecasting, p. 42

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 2 JANUARY 1951 No. 1

AGRICULTURE · COMMERCE · AERIAL AND MARINE NAVIGATION · PUBLIC HEALTH · INDUSTRY · ENGINEERING
AMERICAN METEOROLOGICAL SOCIETY
1919

SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on General and Extended Forecasting

(For complete table of contents see back cover)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains from 100 to 200 abstracts of current periodical literature and monographs in the fields of meteorology, hydrology, oceanography, etc. These abstracts are arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of from 50 to 250 important references on a special subject without respect to recency of material. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject. Preference is given to recent material, comprehensive works, material from obscure sources, and items with good bibliographies.

Vol. 1, No. 1–11, Jan.–Nov. 1950 carried the following bibliographies: *Atmospheric Pollution, Aerobiology, Cloud Physics and "Rainmaking," Hail, Tornadoes, Volcanic Dust, Climatic Changes, Thunderstorms, Icing, Acoustical Propagation* and *Evaporation.*

Forthcoming bibliographies will be:

1. **Extended Forecasting,** Vol. 2, No. 1, Jan. 1951.
2. **Long Range Forecasting,** Vol. 2, No. 2, Feb. 1951.
3. **Soil Temperatures,** Vol. 2, No. 3, Mar. 1951.
4. **Nomograms and Computation Tables,** Vol. 2, No. 4, April 1951.

Other bibliographies in preparation for 1951 are: *Carbon Dioxide in the Atmosphere, Climatology of the Near East, Machine Methods in Meteorology, Medical Meteorology, Objective Forecasting, Radar and Radio Meteorology, Special Winds* and *Turbulence.*

Part III contains a listing of the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the June and December issues cumulative indexes are published.

The Missing Pages In This Volume Are Advertisements

In the mean time let no one expect any great progress in the Sciences . . . unless Natural Philosophy be applied to particular Sciences, and particular sciences again referred back to Natural Philosophy.

FRANCIS BACON **Novum Organum** I (lxxx)

INTRODUCTION

During the first year of *Meteorological Abstracts and Bibliography*, about 2,000 abstracts of current material, and 2,000 annotated entries on eleven special subjects of interest to meteorologists, were published. During the coming year our primary aim will be to increase not only the *number* of articles abstracted, but the *range of subject coverage* so as to help achieve the progress which Lord Bacon says will come only through application of the general to the specific and the specific to the general.

Secondly, we will attempt to broaden the *language coverage*. Although material from 40 countries in 20 languages was abstracted in Volume 1, the preponderance of the material was in only 4 of these languages: English (60%), German (25%), French (5%) and Russian (4%). It is obvious that the other 16 languages, including Italian, Spanish, Japanese, Dutch, the Scandinavian languages and the other Slavic languages (besides Russian) should account for more than 6% of the total literature on meteorology. Of course the material written in English or German is often from countries whose native language is one of the other languages mentioned above. A check of material published in these latter countries shows a much greater output than the language alone would indicate. However, we are aware that material from many countries is often slow in reaching us, or is overlooked because of insufficient checking of bibliographies or publications in less familiar languages.

Our third aim will be to shorten the elapsed time between publication of the original article and the abstract. In the past year, 75% of the "current" material abstracted was less than 2 years old. As the backlog of wartime material is exhausted this percent will be greatly increased.

Further, we will attempt to improve the accuracy, style, readability, classification and indexing of the material published so that this publication will better serve the needs of meteorological researchers.

Finally, as you will note, the color of the cover has been changed in order to make it easier to distinguish separate issues of Volume 2 from those of Volume 1. The choice of colors was not made because of any chauvinistic motives. In fact the colors *red, white and blue* are the primary colors of the flags of a score of countries besides the U. S. A. (Australia, Canada, Chile, Costa Rica, Cuba, Czechoslovakia, Dominican Republic, France, Great Britain, Iceland, Liberia, Luxemburg, Netherlands, New Zealand, Norway, Panama, Paraguay, Siam, Yugoslavia and others), and so are truly a universally popular color combination.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used in this issue may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory (and American Meteorological Society) Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts.

Geographic locations are in the English form rather than the form used locally, for example, Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5–6):146–151, May–June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5–6 (No. 5 and 6), *pages* 146–151, May–June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

GENERAL METEOROLOGY

2.1–1 551.5(03)

Keil, Karl, **Handwörterbuch der Meteorologie.** [Meteorological glossary.] Frankfurt a. M., Fritz Knapp [1950]. 604 p. figs., tables, refs. (in text). **MH-BH**—An excellent glossary of over 3500 meteorological and related terms used in technical German literature. Definitions of terms range in length from one line to 5 pages (e.g., on Aktinometers). There are many illustrative diagrams, charts, tables, etc. to add precision to the definitions and break the monotony of the longer textual essays.

In addition to definitions of technical terms, the glossary contains numerous items which show evidence of the broad perspective and imagination of the author in providing material which would be useful to every writer, student or library in the world. For instance, there are scores of biographical entries, not only for prominent German scientists of the past and present, but for many of the most renowned of England, France, Russia, the U.S.A., etc. Then there are pertinent facts about many geographical places frequently mentioned in meteorological literature (Katmai, Fichtelberg, and others) and observatories (Blue Hill, Mount Weather, Lindenberg, Friedrichshafen, etc.). Symbols used to represent physical constants in meteorology are defined as well as signs and symbols used in international synoptic codes. Samples of forms used in synoptic meteorology and climatological observations are included. Another useful feature is the inclusion of references to the leading meteorological and geophysical publications (periodicals such as *Meteorologische Zeitschrift, Meteorologische Rundschau, Annalen der Meteorologie, Quarterly Journal of the Royal Meteorological Society, Petermanns Mitteilungen*, etc.). A few American or English terms used in airways work are included (zero zero, pea soup, closed in, shoot the balloon). According to German custom, all entries begin with capital letters so the glossary would not be useful to the foreign writer who wishes to determine whether or not a word is a proper or common noun. *Subject Headings:* **Glossaries, German Language.**—*M.R.*

2.1–2 551.5(05) 55(05)

Archiv für Meteorologie, Geophysik und Bioklimatologie. Published by Springer-Verlag, Vienna 1, Mölkerbastei 5, Austria. Editors: Dozent Dr. W. Mörikofer and Prof. Dr. F. Steinhauser. Ser. A., Meteorologie und Geophysik, Band 1, Heft 1, 1948 was first volume issued. Band 3, Heft 1–2, 1950 is latest issue received. Ser. B., Allgemeine und Biologische Klimatologie, Band 1, Heft 1, 1948 was first volume issued. Band 2, Heft 3, 1950 is latest number received. Beginning in 1950 one volume a year will appear. Articles are in German, French and English. Contains both original articles and reviews. Price—Foreign $20–25. Size, 24×16 cm. Approximately 460 pages per volume. **MH-BH**—This double series which presents outstanding contributions in the fields of meteorology, oceanography and other branches of geophysics (Ser. A); and climatology and bioclimatology (Ser. B), has now become well-established and can be considered as a regular periodical since one volume will appear each year. In quality of material, editorial standards and style of publication, as well as in the international scope of contributing authors, this publication will go a long way toward filling the place left vacant by the lapse of the *Beiträge zur Physik der freien Atmosphäre* on the one hand, and *Bioklimatische Beiblätter der Meteorologischen Zeitschrift*, on the other. Edited by Prof. F. Steinhauser in Vienna and Dozent Dr. W. Mörikofer in Davos, each issue (there are about 3 or 4 in each volume) contains from 4 to 8 original contributions by such writers as: V. Conrad, W. C. Jacobs, H. Reuter, P Courvoisier, F. Sauberer, H. Steinhäusser, A. and F. Defant, O. Burkard, M. Bouët, F. W. P. Götz, R. Scherhag, J. Van Mieghem, H. Israël, F. Baur, Raethjen, L. Dufour, H. Flohn, F. Möller, H. Hoinkes, Schneider-Carius. Each issue contains

a few shorter contributions and a number of comprehensive reviews (all in German) of the leading works which have appeared since the war. Because of the high quality of the publication, the price is out of the range of most individual research workers, but as the contributions are of such permanent value, no good library in geophysical or biological science could afford to be without it. *Subject Headings:* **General meteorology, Geophysics, Bioclimatology, Periodicals.**—*M.R.*

2.1–3 551.5:55:551.586:61(08)

Akademiia Nauk, SSSR i Vsesoiuznyĭ Institut Eksperimental'noĭ Meditsiny, **Trudy El'brusskoĭ Ekspeditsii 1934 i 1935g.** [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, **1936.** 516 p. numerous figs., tables and refs. English summaries. (Akademiia Nauk, SSSR, Komissiia po izucheniiu stratosfery, Tom II.) **DLC**—This book consists of a collection of 36 articles in which the scientific work carried out by the Elbrus expedition of 1934 and 1935 is summarized. They cover the general fields of geophysics, radio engineering and human physiology. Except one article which is in German, all are in Russian with English summaries. The titles of the articles are as follows:

Geophysics

Dobrotin, N., Frank, I., and Cherenkov, P., **Nabliudenie kosmicheskikh luchei s kameroĭ Vil'sona.** [Observation of cosmic rays with a Wilson Chamber.]

Antonov-Romanovskiĭ, V., Grigorov, N., et al., **Rabota s kameroĭ Vil'sona v 1935 g.** [Working with the Wilson Chamber in 1935.]

Konstantinova-Shlesinger, M., **Fliuorestsentnyĭ metod opredeleniia soderzhaniia ozona v vozdukhe.** [Fluorescent method of determination of the ozone content of the air.]

Rodionov, S., Pavlova, E., and Stupnikov, N., **Izmerenie korotkovolnogo kontsa solnechnogo spektra metodom schetchika sveta.** [Measurement of the short wave end of the solar spectrum by means of the light counter.]

Shein, M. and Kats, M., **Izuchenie novykh ul'trafioletovykh luchei solntsa.** [Study of new ultraviolet sun rays.]

Balakov, V., Vafiadi, V., and Krivich, S., **Izmerenie kontsentratsii atmosfernogo ozona metodom pogloshcheniia ul'trafioletovykh luchei.** [Measurement of concentrated atmospheric ozone by means of absorption of ultraviolet rays.]

Dobrotin, N., Frank, I., and Cherenkov, P., **Nabliudeniia svecheniia nochnogo neba metodom gasheniia.** [Observations of the light of the night sky by means of the extinction method.]

Lebedev, A. and Khvostikov, I., **Variatsii intensivnosteĭ zelenoĭ linii svecheniia nochnogo neba.** [Intensity variations of the auroral green line of the night sky.]

Panshin, K., Khvostikov, I., and Cherniaev, V., **Raspredelenie energii v spektre svecheniia nochnogo neba v raznye chasy nochi.** [Energy distribution in the spectrum of the light of the night sky at various hours of the night.]

Panshin, K. and Khvostikov, I., **Poliarizatsiia sveta nochnogo neba.** [Polarization of the light of the night sky.]

Vafiadi, V., Krivich, S., and Pokrovskiĭ, G., **Popytka obnaruzheniia solnechnoĭ radiatsii v kraĭneĭ infrakrasnoĭ oblasti spektra.** [Experiment to determine the radiation of the extreme infra-red spectrum of the sun.]

Lebedev, A. and Khvostikov, I., **Vizual'noe fotometrirovanie sumerek.** [Visual photometry of twilight.]

Bokin, P., Brumberg, E., et al., **Opredelenie prozrachnosti oblakov dlia razlichnykh chasteĭ spektra.** [Determination of the transparency of clouds for different parts of the spectrum.]

Khvostikov, I., **Nekotorye vysokogornye opticheskie nabliudeniia.** [Optical observations in the mountains.]

Panshin, K., Khvostikov, I., and Cherniiaev, V., **Nekotorye svoĭstva rasseiannogo sveta dnevnogo neba.** [Some properties of scattered day light.]

Baranov, S. and Pokrovskaia, I., **Rabota meteorologicheskoĭ gruppy EKNE 1935 g.** [Meteorological observations made on the Elbrus by the Combined Expedition of the Academy of Sciences in 1935.]

Merkulova, E., **Rezul'taty izmereniĭ nekotorykh atmosferno-elektricheskikh elementov na El'bruse.** [Results of measurements of some elements of atmospheric electricity on the Elbrus.]

Remizov, N., **Elektricheskoe sostoianie vozdukha v vysokogornykh usloviiakh El'brusa.** [Atmospheric electricity on the Elbrus.]

Radio engineering

Riabov, K. and Pronin, F., **Rezul'taty izmereniĭ naprezhennosti polia radioveshchatel'nykh stantsiĭ na El'bruse i v Svanskom kotlovane Kavkaza.** [Results of the measurement of field intensity of the broadcasting stations on the Elbrus and in the Svanetia Valley (Caucasus).]

Shchetinin, A. and Kaminskiĭ, N., **Rasprostranenie u.k.v. v gorakh.** [Propagation of ultra-short waves in the mountains.]

Prasolov, I., **Izuchenie atmosfernykh razriadov v raĭone El'brusa.** [Study of atmospheric discharges in the Elbrus area.]

Physiology and medicine

Zhukov, A. and Frank, G., **Fiziologicheskie issledovaniia na El'bruse.** [Physiological investigations on the Elbrus.]

Serafimov, B., **Gornaia bolezn'.** [Mountain sickness.]

Vladimirov, G. and Raĭko, Z., **Vliianie shtandartnoĭ myshechnoĭ raboty v vysokogornykh usloviiakh na molochnuiu kislotu krovi.** [The influence of standard muscular work at high altitudes on the lactic acid content of the blood.]

Vladimirov, G., Miliushkevich, G., et al., **Vliianie akklimatizatsii na gazovyĭ sostav krovi.** [The influence of acclimatization on the gaseous content of the blood.]

Baĭchenko, I., **Gazoobmen v pokoe i pri dozirovannoĭ myshechnoĭ rabote na vysote 3000 i 4250 m.** [The gaseous metabolism during rest and standard muscular work at altitudes of 3000 and 4250 m.]

Zhukov, A., **Metodika i rezul'taty issledovaniia organa slukha na vysotakh.** [Methods and results of observations on the auditory organs at high altitudes.]

Zhukov, A., **Dinamika izmeneniĭ vozbudimosti kozhnoĭ chuvstvitel'nosti i zritel'nogo apparata na vysotakh.** [Dynamics of the changes in the tactile and visual sensations at high altitudes.]

Kronheim, Georg, **K klimatofiziologii obmena veshchestv.** [Climate and the physiology of metabolism.]

Timofeev, N., **Izmeneniia ostroty vkusa i reaktsii sliunootdeleniia na vkusovye razdrazhiteli v zavisimosti ot prebyvaniia na razlichnykh vysotakh gory El'brusa.** [Changes in the acuity of taste and the reactions of salivary glands to taste stimulants at various altitudes on Mount Elbrus.]

Vereshchagin, N. and Boldyrev, V., **Izmenenie vegetativnykh protsessov v organizme pri prebyvanii v vysokogornykh usloviiakh.** [Changes in some vegetative functions in an alpine climate.]

Fedorov, N. and Fedorova, V., **Ob izmeneniiakh tsvetnogo zreniia na El'bruse.** [On changes in color vision on the Elbrus.]

Zhikharev, S. and Prilezhaeva, T., **O nekotorykh izmeneniiakh krovi v usloviiakh vysokogornogo klimata.** [Blood changes in an alpine climate.]

Prokhorova, L., **Sravnenie raspredeleniia energii v ul'trafioletovom kontse spektra solntsa na raznykh vysotakh fotograficheskim sposobom.** [Comparison of the distribution of energy in the ultraviolet end of the solar spectrum at various heights by means of the photographic method.]

Kronheim, G. and Prokof'eva, E., **Vliianie nekotorykh faktorov gornogo klimata na obmen veshchestv.** [The influence of certain factors of a mountain climate on metabolism.]

Zhikharev, S., **Reaktsii kozhi na deĭstvie luchistoĭ energii v vysokogornom klimate.** [Reaction of the skin to radiant energy in an alpine climate.]

Subject Headings: **Geophysics, Medical climatology, Elbrus Expedition, Caucasus, U.S.S.R.**—*M.R.*

2.1–4 551.5(09)(431)

*Keil, Karl, **Ein Beitrag zur Geschichte der Meteorologie in Preussen.** [A contribution to the history of meteorology in Prussia.] *Reichsamt für Wetterdienst, Wissenschaftliche Abhandlungen*, 4(7), **1938.** 17 p. 3 figs., 4 refs. **DLC**—The author presents evidence indicating that as early as 1817 the Prussian government took steps to establish meteorological stations. The first Prussian guide for meteorological observers is reprinted. The official sponsoring of weather observations by H. W. Brandes in 1820, the observations of Tillberg in Greifswald and of Nizze in Stralsund, are discussed. Statements on the influence of weather upon man, animals and plants and on the relationship between weather and disease, are quoted. *Subject Headings:* **General meteorology, Bioclimatology, History, Prussia.**—*I.L.D.*

2.1–5 551.5(09)(469)

Ferreira, H. Amorim, **Observações meteorológicas em Portugal antes da fundação do Observatório do Infante D. Luiz.** [Meteorological observations in Portugal before the foundation of the Infante D. Luiz Observatory.] *Lisbon. University. Faculdade de Ciências, Revista*, 3(9):17–29, **1943.** numerous refs. (in text). **MH-BH**—Mention is made in literature of daily records of weather for Lisbon prior to 1632, but the earliest available Portuguese observations are those for Funchal, Madeira (1747–1753) made by the English physician, Dr. Thomas Heberden. In Lisbon observations are available for 1781–1785. Details of many other early records, down to the establishment of the Observatório Meteorológico do Infante D. Luiz in 1856, are given. *Subject Headings:* **Meteorological observations, History, Portugal.** —*M.R.*

2.1–6 551.5(058)

†Great Britain. Meteorological Office, **Annual report of the Director of the Meteorological Office, presented by the Meteorological Committee to the Secretary of State for Air for the year April 1, 1949 to March 31, 1950.** London, H. M. Stationery Office, **1950.** 51 p. tables. **MH-BH**—Among the topics dealt with are organization and supply of forecasts, other services to government departments and the public in climatology, agricultural meteorology, upper air statistics, research and development. The organization and staffing of the office are set out, including training methods and the activity of the library. Appendix VI gives a list of publications issued during the year or published by members of the staff. *Subject Headings:* **Meteorological services, Annual reports, Great Britain.**

2.1–7 551.5:06(04)

Brooks, Charles F., **Thirty years of the American Meteorological Society.** *American Meteorological Society, Bulletin*, 31(6):210–214, June **1950. MH-BH**—A thorough discussion of the background for and the accomplishments of the American Meteorological Society, since Dec. 29, 1919 as told by the chief promoter of the society at its Anniversary Meeting in St. Louis (Jan. 3, 1950). Included are the names of those who helped organize the society, data on the growth in membership and subscriptions (to the Bulletin) from one lustrum to the next, etc. *Subject Headings:* **American Meteorological Society, History, Addresses.**—*M.R.*

2.1–8 551.5:06(43)

†Meteorologisches Amt für Nordwestdeutschland, **Bericht über die Tätigkeit in dem Jahrfünft 1945 bis 1949.** [Report on the activity in the five years 1945 to 1949.] Hamburg, **1950.** 75 p. 5 charts. **MH-BH**—An account of the rebuilding of the N.W. German Weather Service, the regional organization in the British zone centered at Hamburg, and the work of the different branches. A list of the official publications and those of members of the staff covers p. 63–75. Charts show administrative set up, synoptic network, climatological and rainfall stations, etc. *Subject Headings:* **Meteorological services, Hamburg, Germany.**—*C.E.P.B.*

2.1–9 551.5:06(494)

Lugeon, Jean, **Der Neubau der Schweizerischen Meteorologischen Zentralanstalt.** [The new building of the Central Swiss Meteorological Service.] [Zurich], Neue Zürcher Zeitung, Wednesday, midday issue, No. 2744(85), 5:1–4 and 6:1–4, Dec. 28, **1949.** 2 figs., 7 photos.

MH-BH—Description and photographs of the exterior and interior of the new central office of the Swiss Meteorological Service at Zurich, together with an historical account of the service. The building is entirely functional and contains excellent laboratories, library and observing facilities. *Subject Headings:* **Meteorological services, History, Zurich, Switzerland.**—*M.R.*

2.1–10 551.5:37

Ovey, C. D., **The pioneer course in meteorology at Malham Tarn Field Centre, 6–13 September 1950.** *Weather*, 5(11):389–392, Nov. 1950. 4 photos. **DWB**—Brief account of a very successful study week. Note by Kevin McGarry on a broadcast news talk about the center (p. 392) and letters by H. W. Mirehouse and J. W. Cunnah p. 397. *Subject Heading:* **Teaching of meteorology, England.**

2.1–11 551.5:37

Texas, University, Dept. of Aeronautical Engineering, **Program in meteorology, 1950.** Austin, Texas, 1950. 12 leaves. **MH-BH**—A detailed description of the courses in meteorology and oceanography offered at Texas University, including material on employment opportunities, facilities for study and research, and the climate of Austin, Texas. *Subject Headings:* **Teaching of meteorology, Opportunities in meteorology.**—*M.R.*

2.1–12 551.5:63(73)

Dale, Robert F., **Agricultural meteorology in the U. S. A.** *Weather*, 5(11):385–388, Nov. 1950. **DWB**—Brief account of work at state agricultural colleges of Iowa, Missouri and North Carolina (corn, tobacco), Southern Cooperative Group (vegetables) and at Seabrook Farms, New Jersey (by Thornthwaite), etc. *Subject Headings:* **Agricultural meteorology, United States.**

2.1–13 551.5:63

Smith, L. P. and Gloyne, R. W., **Meteorology and the farmer.** *Weather*, 5(11):375–377, Nov. 1950. 2 figs., photo. **DWB**—The agricultural meteorologist must study the needs of the farmer. Discusses types of forecast, limiting climatic conditions for crops, incidence of frost and excessive wind, irrigation problems. *Subject Heading:* **Agricultural meteorology.**

2.1–14 551.5:63

Száva-Kováts, József, **Talajközeli légállapotok irányítása a növénytermeles érdekében.** [Artificial control of near-the-ground meteorological conditions for improving the yield of field crops.] A Pázmány Péter Tudományegyetem Légkörtani és Éghajlattani Intézetének Kiadványai, [Publications of the Meteorological and Climatological Institute Pázmány Péter University], Budapest, No. 2:3–22, **1948.** 6 figs., 3 tables, 6 refs., equations. English translation by author p. 22–38. Figs., tables, refs. only in original Hungarian article. **MH-BH**—The heat and water balance of the lower atmosphere and of the upper stratum of soil of a tomato field was altered by increasing the albedo of the soil. The effect of the changed microclimate, characterized by greatly increased intensity of reflected radiation, upon tomatoes was investigated. The experimental procedure and method of calculating the heat balance are described. A natural soil surface is characterized by a large gain of heat by radiation; this heat is expended in evaporation and in heating the soil and air. Soil surface with high albedo loses heat by radiation and evaporation; these losses are compensated by heat conduction from the soil and air. Blossoming, maturation and ripening of plants were accelerated but size and shape were unchanged. Increase in crop is attributed to increased actinic radiation, increased intake of water of which more is available as result of reduced evaporation and increased assimilation. *Subject Heading:* **Agricultural meteorology,**—*I.L.D.*

2.1–15 551.5:629.13:06(03)

International Civil Aviation Organization, **Third session of the Meteorological Division, Paris, March 1950.** Final report. Montreal, 1950. 340 p. **DWB**—*Subject Headings:* **International Civil Aviation Organization, Aeronautical meteorology, Convention proceedings, Glossaries.**

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

2.1–16 551.501.4:551.511

Antisari, Ottavio Vittori, **Nomogrammi per la determinazione del vento di gradiente al suolo e in quota.** [Nomograms for determination of the gradient wind at the surface and aloft.] *Rivista di Meteorologia Aeronautica*, 10(1):18–28, Jan.–March **1950.** 7 figs., 5 refs., 14 equations. Italian, French, English, and German summaries p. 18. **MH-BH**—The theory of the relation between pressure gradient and geostrophic or gradient wind is reviewed and various graphical methods of determining wind velocities from isobaric charts presented and discussed. *Subject Headings:* **Gradient winds, Nomograms.**—*M.R.*

2.1–17 551.501.42:551.547.2

Giallombardo, Carlo, **Tabelle pratiche per la riduzione della pressione vera al livello del mare.** [Useful tables for the reduction of the actual pressure to sea level.] *Rivista di Meteorologia Aeronautica*, 10(1):33–37, Jan.–March **1950.** 2 tables, 7 equations. Italian, French, English and German summaries p. 33. **MH-BH**—Detailed tables are compiled and a method of computation which will enable an observer to reduce any given pressure, from 900 to 1050 mb. to sea level pressure, by a simple process of subtraction is explained. A test of accuracy indicates that results are within +0.02 mb. for heights up to 400 m. The operation is based on the principle of altimeter correction; the true pressure is reduced by use of the table to a height z and after subtracting the actual height, the same table is entered and the sea level pressure derived. *Subject Headings:* **Computation tables, Pressure reduction, Altimetry.** —*M.R.*

2.1–18 551.501.45:551.524:551.510.53

Chicago. University. Institute of Meteorology, **A table of mean virtual temperatures for the air column between sea level and 10,000 feet.** Chicago, University of Chicago Press [1944]. 14 p. graph, 4 tables. **DLC**—Elaborate and detailed tables, using sea level pressure from 960–1059 mb. and 10,000 foot pressures from 640–739 mb. as arguments, give mean virtual temperature in various ranges from +99.9°C. down to −66.4°C. Negative temperatures are given in red, positive in black. Condensed tables and a graphical representation make computation more simple. Theory given. *Subject Headings:* **Computation tables, Nomograms, Upper air analysis, Virtual temperatures.**—*M.R.*

2.1–19 551.501.45

Doodson, A. T., **A method for the smoothing of numerical tables.** *Quarterly Journal of Mechanics and Applied Mathematics*, 3(2):217–224, June **1950.** 12 tables. **DLC**—A combination of both graphic and numerical methods of smoothing tables based on observational data, which is purported to be superior to either method used by itself, is developed. Subsidiary functions based on the differences between values in the table to be smoothed, are smoothed graphically. Examples are shown for smoothing simple and double entry tables. *Subject Headings:* **Methods of computation, Statistical methods.**—*M.R.*

2.1–20 551.501.6:551.511

Hinkelmann, Karl, **Neuberechnung des thermodynamischen Diagrammes nach Stüve.** [Recent revision of Stüve's thermodynamic diagrams.] *Deutscher Wetterdienst in der US-Zone, Mitteilungen*, No. 6, May **1950.** 19 p. fig., 8 tables, numerous equations, append. **MH-BH**—An improved adiabatic chart for aerological calculations is presented and its compilation described in detail. All constants and functions are recalculated and the values used in drawing the moist adiabats given in a table for $t = +40$ to -70°C. and $\delta_{ps} = +150$ to -40. Other valuable tables are given. *Subject Headings:* **Stüve diagram, Physical constants, Nomograms.**—*M.R.*

2.1–21 551.501.7:551.557:629.13

Sawyer, J. S., **Equivalent headwinds. Application of upper-wind statistics to air-route planning.** London, H. M. Stationery Office, **1950.** 20 p. 7 figs., 8 tables, 13 refs., 15 equa-

tions. (*Great Britain Meteorological Office, Meteorological Reports* 2, No. 6.) **MH-BH**—The method of calculation of the equivalent headwind is set out, assuming a normal vector distribution of winds. The mean value along a given route and its variability from place to place and time to time are considered. Mean along a route has a normal Gaussian distribution, but headwinds at places along a route are correlated. The estimated headwind frequencies agree well enough with the observed, but jet streams make the upper and lower 5% unreliable. The effect of pressure-pattern flying is briefly considered. *Subject Headings:* **Upper air winds, Aeronautical climatology.**

2.1–22 551.501.9:06(09)

Hallman, E. S., **110 years ago.** *Weather*, 5(4):155–158, April **1950.** 4 photos. **DWB, MH-BH**—Description of founding and history of Toronto Magnetic and Meteorological Observatory and Canadian Weather Service. *Subject Headings:* **Observatories, Meteorological services, History, Canada.**

OBSERVATIONAL DATA

2.1–23 551.506.1:551.501.9:06

France. Météorologie Nationale, **Côte française des Somalis; bulletin annuel du service météorologique année 1947.** [Annual bulletin of the meteorological service for the coast of French Somaliland, 1947.] [Paris, Imprimerie Nationale, **1949.**] 28 p. map, tables. (Ministère des Travaux Publics, des Transports et du Tourisme, Secrétariat Général à l'Aviation Civile et Commerciale.) **MH-BH**—A model annual climatic summary for a single region with only a few stations. The location of all classes of stations is shown on a topographic chart. The history and organization of the Meteorological Service of French Somaliland are given, in addition to a discussion of the weather of each month and tables of the usual meteorological elements plus evaporation, visibility and other unusual phenomena. Graphs include wind roses for Djibouti. *Subject Headings:* **Climatic data, Annual reports, Meteorological services, French Somaliland, Africa.**—*M.R.*

2.1–24 551.506.1:551582.3(94)

*Netherlands. Koninklijk Nederland Meteorologisch Instituut, **Zeegebieden rond Australie; oceanografische en meteorologische gegevens.** [Sea areas around Australia; oceanographic and meteorological data.] The Hague, No. 124, **1949.** 96 p. Price F20. **MH-BH, DWB**—This excellent marine atlas consists of large detailed charts containing isolines or statistical data for meteorological elements based on compilations of hundreds of thousands of ships' observations collected by the Dutch, British, American, French and German marine meteorological services since 1854. Original log books were used in most cases, but punched card libraries of the U.S. and Netherlands Services (up to 1939) were included. Charts include mean or frequency data on ocean surface currents, pressure, winds, precipitation, fog, air and sea surface temperatures, storms and typhoons. *Subject Headings:* **Marine atlases, Southwest Pacific, Australia.**—*M.R.*

2.1–25 551.506.7(058)(493)

*Belgium. Institut Royal Météorologique, **Observations aérologiques de la Station de Radiosondage d'Uccle. Temperature et humidité relative de l'air aux pressions standards.** [Aerological observations of the Uccle Radiosonde Station. Temperature and relative humidity of the air according to pressure standards.] Brussels, **1949. MH-BH**—The first of a series of annual publications giving the daily and monthly mean values of temperature and humidity for sea level, 900, 800, 700, 600, 500, 400, 300, 250, 200, 170, 150, 130, 100, 80, 60, 50 and 40 mb. levels for observations made at 0300 and 1500 G.M.T. at Uccle, Belgium. *Subject Headings:* **Aerological data, Annual reports, Uccle, Belgium.**—*M.R.*

2.1–26 551.506.8

†Germany. Deutscher Wetterdienst in der US-Zone, **Zweck und Ziel des Phänologischen Dienstes.** [The purpose and the object of the Phenological Service.] *Mitteilungen*, No. 1, July **1948.** 12 p. 4 maps, 3 tables, 16 refs. **MH-BH**—A thorough treatment of the subject,

for the purpose not only of justifying the Phenological Service of the Deutscher Wetterdienst in der US-Zone, but also in order to make that service more useful to the farmer. *Subject Headings:* **Phenology, Agricultural meteorology.**—*M.R.*

2.1–27 551.506.8(43)

Schnelle, Fritz, **Hundert Jahre phänologische Beobachtungen im Rhein-Main-Gebiet, 1841–1939, 1867–1947.** [A hundred years of phenological observations in the Rhine-Main region, 1841–1939, 1867–1947.] **Meteorologische Rundschau,** 3(7–8):150–156, July–Aug. **1950.** 2 figs., 4 tables. **DWB**—Gives for each year averages and extremes of a number of phenological records from pre-spring to autumn. The duration of different phenological seasons is derived. Parallelism is shown between 20-year means of bloom of snowdrop and mean temperature Feb.–March (earliest flowering and highest temperature 1909–28). *Subject Headings:* **Phenology, Rhine-Main Region, Germany.**—*C.E.P.B.*

2.1–28 551.506.8:92

Surkov, IU. N., **D. N. Kaigorodov—otets russkoĭ fenologii.** [D. N. Kaigorodov—father of Russian phenology.] *Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia,* 81(6):584–588, Nov.–Dec. **1949.** 2 refs. **DLC**—Historical account of work in phenology in the U.S.S.R. during past 75 years, written as a commemoration of the 100th anniversary of the birth of D. N. Kaigorodov. *Subject Headings:* **Phenology, D. N. Kaigorodov, Biography.**—*M.R.*

INSTRUMENTS

2.1–29 551.508

Middleton, William Edgar Knowles, **Meteorological instruments.** 2nd ed. rev. Toronto, University of Toronto Press, **1943.** 227 p. 169 figs., tables, refs., 10 equations. **DLC**—In this second edition of the book, that was published first in 1941, the author discusses the underlying principles, construction and use of the meteorological instruments usually found at meteorological stations. The following topics are treated: the general properties of meteorological instruments; instruments for measuring atmospheric pressure, temperature and humidity, precipitation, evaporation, surface winds and upper winds by means of pilot balloons; instruments for recording sunshine; instruments for investigating clouds and the upper air. The mathematical demonstrations involve only elementary calculus and the simplest differential equations. The revisions include an expansion of the sections on mercury barometers, psychrometers and hygrometers and an incorporation of the more recent developments in instrumentation for studying the upper air. The book is copiously illustrated and contains references to original papers. *Subject Heading:* **Meteorological instruments.**—*I.L.D.*

2.1–30 551.508

Reiner, Josef, **Die meteorologischen Instrumente.** [Meteorological instruments.] Pössneck, Rudolf A. Lang, **1949.** 170 p. 135 figs., 14 tables. **DLC**—A concise, clearly written and simple account of the various meteorological instruments that are used to measure temperature, atmospheric pressure, atmospheric humidity, precipitation, condensation, evaporation, wind velocity, solar radiation and cloudiness. The theoretical and physical principles underlying the measurements and apparatus are discussed in qualitative, generally non-mathematical language. The book is richly illustrated and contains a list of German meteorological stations with their elevations above sea level. *Subject Heading:* **Meteorological instruments.**—*I.L.D.*

2.1–31 551.508.21:551.21

Kaplan, Lewis D. and Robinson, G. D., **Measurement and estimation of atmospheric radiation.** *Royal Meteorological Society, Quarterly Journal,* 76(330):490–492, Oct. **1950.** fig. **MH-BH**—Correspondence about estimates of radiative flux by Robinson in Quarterly Journal 1947, 1950 (*see item* 3–62, *Meteorological Abstracts and Bibliography,* 1(3), March 1950). *Subject Headings:* **Radiometers, Radiation.**

2.1–32 551.508.21

Thams, Chr., **Ein Beitrag zum Eichproblem des Bimetallaktinographen; Erfahrungen mit einer neuen Schwärzung und Weissung der Bimetall-Lamellen.** [Contribution on the calibration of bimetallic actinographs; experiments with a new method of blackening and whitening of bimetallic plates.] *Schweizerische Meteorologische Zentralanstalt, Annalen*, (Vol. 1944):19–25, [1945]. 4 figs., 2 tables, 7 refs. (Reprint available.) **MH-BH**—Since June 13, 1944 a bimetal actinograph has been in use at the Locarno-Monti Observatory. Experiences and results of calibrations and comparisons with Moll-Gorczynski solarimeters and the dependence on solar altitude are given in detail and discussed. *Subject Headings:* **Actinometers, Calibration of instruments.**—*M.R.*

2.1–33 551.508.23

Jowett, C., **Slotted sunshine recorder.** *Meteorological Magazine, London*, 79(940):299–300, Oct. **1950.** photo. **MH-BH**—A Campbell-Stokes sunshine recorder is now available for use in the U.K. in which the used part of a summer sunshine card can be withdrawn through a slot about 4.30 p.m. B.S.T. and a new card inserted through another slot to record next day's sunshine up to 8.30 a.m. This avoids the need for changing the card after sunset. *Subject Heading:* **Sunshine recorders.**

2.1–34 551.508.26

*Paulsen, H. Schieldrup, **On sling thermometers.** *Bergen. University. Årbok* 1949, *Naturvitenskapelig rekke*, No. 11, [1950]. 14 p. 3 figs., 5 tables, ref. **MH-BH**—Temperatures observed in a thermometer shelter may be 1°C. or more higher than in the free air (as observed with an Assmann psychrometer). Since the psychrometer is very expensive, a cheaper aspirated thermometer was devised, which gives better temperature readings than in the shelter and in addition does not have the *wet-bulb effect* that ordinary sling thermometers have in the rain. Comparative data in sunshine and rain given in tables. Equipment shown in illustrations. *Subject Heading:* **Thermometers.**—*M.R.*

2.1–35 551.508.29:551.525

Deacon, E. L., **The measurement and recording of the heat flux into the soil.** *Royal Meteorological Society, Quarterly Journal*, 76(330):480–484, Oct. **1950.** 3 figs. **MH-BH**—Relatively simple instruments for measuring heat flux into or out of soil are described, with methods of calibration. One consists of a 5 cm. metal disc of bismuth between copper discs 4½ mm. apart, producing a thermal e.m.f. proportional to temperature difference between copper discs. (A better combination of copper and tellurium-silver alloy is also referred to.) A recording type using multiple junction thermocouples on glass is described and a record shown. *Subject Headings:* **Temperature instruments, Thermocouples, Soil temperature.**

2.1–36 551.508.71

†Prudhomme, André, **Les procédés hygrométriques.** [Hygrometric methods.] *Annales de Géophysique*, 6(2):117–127, April–June **1950.** 133 refs. **MH-BH**—The author discusses the various methods (and their underlying principles), that are employed in determining the water vapor content of air. The following are among the methods described: hair hygrometer, gold beater's skin hygrometer, psychrometer; gravimetric, volumetric, manometric and thermometric determination of water vapor; dew point hygrometer, hygrometer utilizing the absorption of infrared by water vapor, porous wall hygrometer, electrolytic and electric hygrometer, hygrometer utilizing condensation nuclei, hygrometer utilizing the dielectric constant of air, hot wire hygrometer, hygrometer utilizing thermic conductivity, etc. Also methods of measuring the actual water content of clouds are considered. *Subject Heading:* **Hygrometry.**—*I.L.D.*

2.1–37 551.508.822

Vergleich der in Europa im täglichen Aufstiegsbetrieb eingesetzten Radiosondentypen. [Comparison of the radiosonde types used in daily ascents in Europe.] *Annalen der Meteorologie*, 3(7–8)223–224, **1950.** fig., table. **DWB**—Summary of report of Sub-commission of

Regional Commission VI. Figure and table compare British, French, Finnish and American types. *Subject Heading:* **Radiosondes.**—*C.E.P.B.*

2.1–38 551.508.99:551.593.5

Goldschmidt, Johannes, **Objektive Farbmessungen in der Meteorologie.** [Objective color measurements in meteorology.] *Zeitschrift für Meteorologie*, 4(6):166–176, June **1950.** 9 figs., 4 tables, 12 refs. Bachmann, Karl-Heinz, **Die rechnerische Bestimmung von Lichtfilterkombinationen mit vorgegebener Durchlässigkeit.** [The determination by calculation of combinations of light filters with given transmission.] *Ibid.*, p. 176–179. tables. **MH-BH**—The measurement of color is important in meteorology. Goldschmidt describes a photometer designed for rapid and accurate measurement of the three primary colors in sky light. It consists of four combinations of filters and a resistance cell; photo and diagram given. Determination of constants of instrument described and a series of measurements set out. Bachmann gives a mathematical method of calculating the transmission of any combination of filters in different wave lengths. *Subject Heading:* **Sky light color measurement.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

2.1–39 551.509:551.506.8

Schnelle, Fritz, **Wetterkundlicher Wegweiser für Landwirte, Obstbauer, Gärtner, Winzer und Meteorologen.** [Weather guide for farmers, gardeners, wine growers and meteorologists.] *Deutscher Wetterdienst in der US-Zone, Mitteilungen*, No. 3, June **1949.** 36 p. 4 maps, 14 refs. **MH-BH**—The manner in which various agricultural operations can be made less hazardous, or crops protected by using the specialized forecasts of the Deutscher Wetterdienst (in the U. S., British and French Zones) is treated in great detail. Not only the forecasts themselves are listed, but the phenological interpretation or the period when applicable is stressed. Each individual crop is considered separately. *Subject Headings:* **Weather forecasting, Phenology, Agricultural meteorology.**—*M.R.*

2.1–40 551.509.1

Great Britain. Meteorological Office, **International meteorological code adopted by the International Meteorological Organisation, Washington, 1947. Decode for the use of shipping incorporating the code for weather reports from and to ships and the analysis code for use of shipping.** London, H. M. Stationery Office, **1950.** 39 p. chart, fold. plate, 29 tables. At head of title: M.O. 509 (2nd ed.) **MH-BH**—In addition to full code and specifications, publication gives tables for finding dew point and for conversion of barometric observations, areas, call signs and stations for bulletins for shipping, instructions on plotting charts and plates of "consol coverage and accuracy by day" and "by night." *Subject Headings:* **Synoptic codes, Marine broadcasts.**—*C.E.P.B.*

2.1–41 551.509.3:551.578.4

*Brooks, C. F., Conrad, V. A., and others, **Mt. Washington and Blue Hill aids to snowstorm forecasting for Boston.** Harvard University, Blue Hill Meteorological Observatory, Sept. 26, **1950.** 53+ leaves. 13 figs., tables, 8 refs. (Final report 1949–50, on snowstorm phase of U. S. Weather Bureau Contract Cwb-8120.) (Unpublished typescript.) **MH-BH, DWB**—Snowstorms which occurred during 12 years are analyzed according to seasons and synoptic types 6 hours in advance, according to depth or intensity of the snowstorm, air flow or temperature at Mt. Washington, etc., and similar analysis made of 5 other years of data to check the reliability of the objective forecasts. As a result of the selection of the proper parameters, high accuracy could be expected for six hour snowfall forecasts. Considerable attention was payed to the correction of temperature and the nature of the relation between surface and free air temperatures on Mt. Washington. Incidental studies were made of the eddies in the lee of Mt. Washington, the mechanism of snowstorms in Japan and Scotland as compared with those in New England, etc. A detailed statistical and graphic study. *Subject Headings:* **Objective forecasting, Snow forecasting, Massachusetts.**—*M.R.*

2.1–42 551.509.3

Charney, Jule G., **Progress in dynamic meteorology.** *American Meteorological Society, Bulletin*, 31(7):231–236, Sept. **1950. MH-BH**—This article is a general non-mathematical survey of the principal developments in dynamic meteorology during the past 50 years. The author discusses the work of V. Bjerknes and associates in integrating the equations of hydrodynamics and thermodynamics to describe and predict the state of the atmosphere; J. Bjerknes' studies on the motion of the upper air and his development of the barotropic model; C.-G. Rossby's adoption of a nondivergent barotropic model of the atmosphere; various baroclinic theories to account for the release of energy in the atmosphere; the general circulation theory of Rossby and the possibility of numerical prediction by dynamical methods. *Subject Headings:* **Dynamic meteorology, Progress in meteorology, Weather forecasting.**—*I.L.D.*

2.1–43 551.509.3

Domínguez Aguirre, Ernesto, **Elementos de prevision a corto plazo en la Republica Mexicana.** [The fundamentals of short range forecasting in Mexico.] [Veracruz, Ver., Sección Autografica, Escuela Naval Militar, **1941.**] 137 p. 15 figs., 12 tables, equations. (Mimeographed.) **DLC**—An elementary discussion of the technique of weather forecasting and a description of the weather of Mexico. The generally accepted methods of constructing isobaric relief maps and synoptic charts and of analyzing air masses are described. The role of topography in the general circulation over Mexico is discussed. The types of air masses and weather prevailing over Mexico are classified and described; special weather phenomena such as the northwinds of the Gulf of Mexico, fogs, hurricanes, etc., characteristic of particular regions, are analyzed in detail. The appendix contains a list of the meteorological stations of Mexico and keys for interpreting the meteorograms of Mexico and of the United States. *Subject Headings:* **Weather forecasting, Mexico.**—*I.L.D.*

2.1–44 551.509.3:551.575:629.13

*§George, J. J., **A brief forecasting study for Charleston, South Carolina.** [Atlanta], Eastern Air Lines, Inc., Meteorological Dept., **1947.** 25 leaves. 15 figs., 3 tables. (Mimeographed.) **DWB**—An elaboration and refinement of a study on the same subject prepared by A. J. Meyer, Jr. in 1943. Pre-warm frontal conditions, radiation and advection fog cases are catalogued by seasons; scatter diagrams, objective charts, etc. presented along with rules for improving airways forecasts at Charleston. Typical synoptic charts, tracks of depressions, etc. also included and discussed. *Subject Headings:* **Objective forecasting, Airways forecasting, Fog forecasting, Charleston, South Carolina.**—*M.R.*

2.1–45 551.509.3:551.575

*§George, J. J., **A brief forecasting study for Kanawha County Airport, Charleston, W. Va.** [Atlanta], Eastern Air Lines, Inc., Meteorological Dept., July 13, **1949.** 7+ leaves. 5 figs., table. (Mimeographed.) **DWB**—Peculiarities of the Kanawha Airport with respect to air masses and fog formation are discussed. One year of data is used to establish conditions under which fog is most probable. Wind conditions are the most sensitive criteria for occurrence or non-occurrence; after it has been determined that fog may occur dew point depression is used to estimate time of formation of fog. A detailed catalogue of conditions for each case studied is included. *Subject Headings:* **Fog forecasting, Objective forecasting, Charleston, West Virginia.**—*M.R.*

2.1–46 551.509.3:551.515.1

*§George, J. J., **Weather forecasting at New York associated with the formation of Atlantic secondaries.** [Atlanta], Eastern Air Lines, Inc., Meteorological Dept., Oct. **1948.** 42 leaves. 15 figs., 5 tables, 6 refs. (Mimeographed.) **DWB**—A synoptic, statistical and case history study, based on 12 years of data (1936–1948) to develop some objective tools and rules-of-thumb for forecasting the formation; rate and direction of movement, and deepening attending rain, snow, ceilings and visibility; duration of low ceilings and formation of freezing rain. Position and axis of anticyclone, trough, cloud and rain areas; upper air conditions, etc. are all used as objective criteria to establish the basic prognostic chart, from which secondary conditions can be determined from general pattern. *Subject Headings:* **Objective forecasting, Cyclogenesis, Secondary depression, New York.**—*M.R.*

2.1–47 551.509.3

Palmén, Erik, **Progress in research in synoptic meteorology.** *American Meteorological Society, Bulletin*, 31(7):237, Sept. **1950. MH-BH**—A brief statement of the developments in synoptic techniques since the introduction of air mass and frontal concepts introduced by the Norwegian school of meteorologists. The author mentions surface and indirect three dimensional analysis, kinematic and dynamic rules for short range forecasting, the "steering principle," thermodynamic investigations of stability, isentropic analysis, developments in the U. S. during the last war, etc. He emphasizes the fact "that efficiency of research in the future depends largely upon effective distribution of data to interested institutions," as well as upon observational data. *Subject Headings:* **Synoptic meteorology, Progress in meteorology.**—*I.L.D.*

2.1–48 551.509.3:551.515.1

*§Visscher, H. B., **The formation of extratropical cyclones in the Gulf of Mexico and the resultant spread of precipitation.** [Atlanta], Eastern Air Lines, Inc., Meteorological Dept., **1948.** 30 leaves. 16 figs., 7 tables. (Mimeographed.) **DWB**—Recognizing that one of the main causes of bad forecasts for the eastern U. S. A. is the failure to properly anticipate cyclogenesis or wave formations along a cold front, the Eastern Air Lines meteorologists undertook two studies; one of the secondaries which form along the Atlantic Coast (*see item* 2.1–46) and this study of waves which form in the Gulf of Mexico and bring bad weather to the Mississippi Valley or southern States. Analysis of 850 mb. charts for 2 years is accompanied by typical synoptic charts and rules for forecasting formation of these frontal waves, and specific aids for forecasting associated weather patterns in the southeast. *Subject Headings:* **Objective forecasting, Cyclogenesis, Gulf of Mexico.**—*M.R.*

2.1–49 551.509.31:551.515.1

§Postma, Klaas Rienk, **The formation and the development of occluding cyclones. A study of surface-weather maps.** 's Gravenhage, Staatsdrukkerij- en Uitgeverijbedrijf, **1948.** 57 p. 45 figs., 14 refs., equations. In English. (Thesis [Ph.D.]—Utrecht.) **DLC**—After examining critically the classical or Norwegian methods of synoptic analysis and the methods used in Germany and America (including the use of upper air analyses), the author goes into the theory of air particle trajectories in travelling depressions, the development of frontal disturbances and especially occlusions. Then the case histories of the situations in the North Atlantic on Nov. 13–19, 1938 and Feb. 3–4, 1948, are treated and illustrated by a series of 32 beautifully analyzed synoptic charts. The maps are all re-analyzed by the author in the light of his objections to other methods of analysis. However, simultaneously analysts in America and elsewhere had come to somewhat similar conclusions regarding extending an occluding front to the center of a depression and other objectionable practices of frontal analysis in the pioneer years. *Subject Headings:* **Cyclogenesis, Synoptic analysis, Synoptic charts.**—*M.R.*

2.1–50 551.509.31:551.575

§Simon, Albert. **Methods of stratus and fog forecasting for Payne Field (Farouk Airport) and vicinity, Egypt.** *American Meteorological Society, Bulletin*, 31(7):257–263, Sept. **1950.** 8 figs. (incl. synoptic charts), 5 tables. **MH-BH**—Fog frequencies, stratus frequencies and the synoptic situation associated with fog and stratus formation at Payne Field are presented. The meteorological conditions during several instances of fog and stratus formation are analyzed. Surface and upper wind criteria for fog and stratus formation and a fog and stratus prediction diagram for Payne Field are given. Directions for the forecaster to follow in predicting fog and stratus are presented. *Subject Headings:* **Fog forecasting, Synoptic analysis, Cairo.**—*I.L.D.*

2.1–51 551.509.31:551.578.1

§Thompson, J. C., **A numerical method for forecasting rainfall in the Los Angeles area.** *Monthly Weather Review*, 78(7):113–124, July **1950.** 9 figs. (incl. 2 synoptic charts), 8 tables, 16 refs., 3 equations. **MH-BH**—Scatter diagrams, with probability lines carefully drawn, are used to make objective forecasts of rainfall at Los Angeles. This method shows a slight edge

over conventional methods. *Subject Headings:* **Rainfall forecasting, Objective forecasting, Los Angeles.**—*M.R.*

2.1–52 551.509.318:521.7

Wiese, H., **Solare Korpuskelstrahlung und Grosswetterlagen.** [Solar corpuscular radiation and general weather situation.] *Zeitschrift für Meteorologie*, 4(6):179–182, June 1950. fig., 7 refs. **MH-BH**—Frequencies of different types of general weather situation over Europe for each day in months of excess and deficit of corpuscular radiation (based on magnetic data) are compared. The greatest frequency peaks (exceeding chance distribution) occur in months of little corpuscular radiation. This is attributed to the undisturbed development of terrestrial rhythms in such months. *Subject Headings:* **Corpuscular radiation, Weather forecasting.**—*C.E.P.B.*

2.1–53 551.509.319

Kibel', I. A., **Prognoz pogody kak zadacha dinamicheskoĭ meteorologii.** [Weather forecasting as a problem of dynamical meteorology.] Akademiia Nauk, SSSR, ÎUbileinyĭ Sbornik, Posviashchennyĭ 30 letiiu Velikoĭ Oktiabr'skoĭ Sotsialisticheskoĭ Revoliutsii, Chast' I, p. 443–453, **1947.** 2 photos, 28 equations. **DLC**—The basic principles of the numerical method of forecasting developed by the hydrodynamic meteorologists Fridman, Kochin and Kibel' are outlined and the equations which are used to bring in the factors of radiative balance, temperature gradient, turbulent diffusion, distribution of water vapor and heat supplied by evaporation and condensation are presented. The method derives from suggestion made by V. Bjerknes (Leipzig, 1913) and elaborated by L. Richardson (1921) that weather prediction can be an exact (mathematical) science if all of the physical factors are properly integrated. This method of Kibel' involves the solution of equations of the 4th order, but by much simplification, is reduced to a process of calculation which would give in less than half an hour, forecasts of wind, pressure and temperature for one point for a period of 24 to 36 hours in advance. The success of the forecasts naturally depends on complete and accurate observations for the area surrounding the point and for the layer of atmosphere from the ground to the tropopause. *Subject Headings:* **Mathematical forecasting, Kibel's method of forecasting.**—*M.R.*

2.1–54 551.509.39:632.187

Altman, Harry E., **The Weather Bureau's fire-weather service.** *Weatherwise*, 3(5):99–102, 118, Oct. **1950.** 4 photos, map. **MH-BH**—Interesting description of activities of the U. S. Weather Bureau in relation to forest fire prevention and control. Chart shows districts and centers in Atlantic, Lakes, Rocky Mountain and Far West regions. Work of Mobile fire unit illustrated. Value of service in reducing size of fires in past 20 years shown. *Subject Heading:* **Fire weather forecasting.**—*M.R.*

2.1–55 551.509.5

Brodovitskiĭ, K. V., **Metodika ob'ektivnoĭ otsenki uspeshnosteĭ predskazaniĭ po universal'noĭ shkale.** [A universal scale for the objective checking of the accuracy of forecasts.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 14(2):171–180, March–April **1950.** 5 equations. **DLC**—A complicated method for statistical evaluation of forecasts or skill in forecasting, taking into consideration the difficulty or ease of forecasting (for a given place or season), the confidence factor the forecaster places in his forecast (possibly 0.5, probably 0.75, certainly 1.5 and very confident 2.0), and other factors for which the verification can be weighted objectively. *Subject Heading:* **Forecast verification.**—*M.R.*

2.1–56 551.509.5

§Ingall, A. F., **Investigation of forecast issued by the Dominion Public Weather Office at Edmonton for Edmonton City valid 10 A.M. May 28th until midnight May 29th, 1949.** *Canada, Meteorological Div., Dept. of Transport, Cir-1800, Tec-75, Experience Report* No. 13, June 17, **1950.** 5 leaves. 5 charts, 2 refs. **MH-BH**—A synoptic study of a situation on the 28th and 29th of May 1949, which fooled the forecasters. Clearing occurred on the lee of the

Canadian Rockies when it was thought that upslope winds and attending stratus would persist. *Subject Headings:* **Forecast verification, Synoptic analysis.**—*M.R.*

2.1–57 551.509.67

†Anderson, Charles E., **Evaluation of results of joint Air Force—Weather Bureau cloud seeding trials conducted during winter and spring 1949.** *U. S. Air Force Cambridge Research Laboratories, Geophysical Research Papers*, No. 4, May **1950.** 30 p. 4 figs., 4 tables, 35 refs., 3 equations. **MH-BH**—Discussion of the theory and application of dry ice seeding to cloud dissipation, cloud formation or precipitation inducement. The tests (48 trials) conducted for this project did not give encouraging results as far as initiating heavy precipitation from cumulus congestus clouds is concerned. Virga was produced from supercooled cumulus on several occasions. Partial dissipation of cloud occurred in 100% of the trials. *Subject Headings:* **Artificial precipitation, Cloud seeding, California, Mobile, Alabama.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF ATMOSPHERE—IONOSPHERE

2.1–58 551.510.41:550.4

Jones, Sir Harold Spencer, **The evolution of the earth's atmosphere.** *Science Progress*, 38(151):417–429, July **1950.** tables. Gives table of present composition of atmosphere and describes variations with height and rate of escape of gases to space. The inert gases are all much rarer in the earth than in the cosmos generally, showing that the earth lost its primitive atmosphere almost completely. The secondary atmosphere resembling the present was formed by chemical processes in the earliest geological times. Origin of CO_2 and nitrogen is attributed to volcanic action, that of oxygen to photosynthesis by plants. *Subject Headings:* **Atmospheric composition, Geochemistry.**

2.1–59 551.510.41

Penndorf, Rudolf, **The annual variation of the amount of ozone over northern Norway.** *Annales de Géophysique*, 6(1):4–9, Jan.–March **1950.** 3 figs., table, 4 refs. Text in English. French and English summaries p. 4. **MH-BH**—Normal daily ozone values and the interdiurnal variations of the amount of ozone have been calculated for Tromsø, Norway. The annual variation of ozone E is analyzed. The interdiurnal variation differs considerably between winter and summer; the standard deviation in July is 9.5×10^{-3} cm. and in December 56×10^{-3} cm. In summer the equilibrium between ozone formation and dissociation is maintained more or less throughout most of the Northern Hemisphere so that the differences of the vertical distribution are small and the interdiurnal variation is small. In winter the vertical distribution is different over middle and high latitudes and so ozone is formed over the polar region. Hence, advection determines the amount of ozone E. *Subject Headings:* **Ozone variations, Norway.**—*M.R.*

2.1–60 551.510.42

Hewson, E. Wendell, **Weather and atmospheric pollution.** *Weatherwise*, 3(5):103–107, Oct. **1950.** 5 figs., 6 refs. **MH-BH**—The effect of weather and wind, turbulence and inversions and topography on severity of pollution from industrial sources. Methods of control, as applied at Trail, B. C., Brookhaven, N. Y. and Los Angeles (smog), by means of meteorological forecasts are described. *Subject Heading:* **Atmospheric pollution.**—*M.R.*

2.1–61 551.510.42

Hewson, E. Wendell, **Recommendations of the Meteorology Panel, United States Technical Conference on Air Pollution.** *American Meteorological Society, Bulletin*, 31(7):264–265, Sept. **1950. MH-BH**—The recommendations are as follows: standardization of instruments, development of basic turbulence theory, study of diffusion of effluents in a city, micrometeorological and microclimatological variables, collection of micrometeorological data by U. S. Weather Bureau, survey of literature on atmospheric pollution, establishment of relationship between wind-tunnel plan and atmospheric flow, study of means for removing contaminants

from air, aerial survey of distribution of inversion fog and measurement of atmospheric electricity. *Subject Heading:* **Atmospheric pollution.**—*I.L.D.*

2.1–62 551.510.42

Magill, Paul L. (comp.), **The smog problem in Los Angeles County.** Second interim report by Stanford Research Institute on studies to determine the nature and sources of the smog, August 1949. Los Angeles, Committee on Smoke and Fumes, Western Oil and Gas Association, 1949. 64 p. 29 figs., 9 tables, 20 photos, 18 refs., append. **MH-BH**—Results of a two year program of research into the source, nature and forecasting of smog in the Los Angeles area. Analysis of the air to determine the concentration of noxious gases, the presence of larger particles, the factors affecting visibility and eye irritation, the meteorological mechanism of smog and the determination of smog index and smog forecasting each comprise a separate chapter; well-illustrated with photographs and schematic diagrams. *Subject Headings:* **Atmospheric pollution, Smog, Los Angeles.**—*M.R.*

2.1–63 551.510.42

Meetham, A. R., **Natural removal of pollution from the atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 76(330):359–371, Oct. 1950. 9 figs., 2 plates, 3 tables. **MH-BH**—The atmospheric pollution collected in deposit gages is divided into ash, combustible matter, sulphates and chlorides, and the distribution of each over Britain is charted and the division between towns and country analyzed. The amounts deposited are compared with estimates of those emitted by burning of coal. The discrepancies require further investigation. The various types of pollution are discussed separately. Emission and deposit of ash are both 1 million tons a year. Size of smoke particles is discussed; it is considered that gages do not collect representative samples. About $1\frac{1}{2}$ million tons a year out of 2.3 million emitted is blown out to sea. Concentration of smoke and SO_2 is charted, winter and summer, and vertical distribution discussed. One and one tenth million tons of SO_2 out of 5 million is blown out to sea. Average life of a smoke particle 1–2 days, of a molecule of SO_2 under 12 hours. More than half the $\frac{3}{4}$ million tons of chlorides a year comes from the sea, mostly in winter. *Subject Headings:* **Atmospheric pollution, Great Britain.**

2.1–64 551.510.42

Pluvinage, Philippe, **Sur la pollution de l'air au Groenland.** [Air pollution in Greenland.] *Annales de Géophysique*, 6(1):68, Jan.–March 1950. table. **MH-BH**—The author describes the application of the method of H. Dessens to an investigation of atmospheric pollution in Greenland. The types of impurities resemble those found in France, except that the proportion of dry particles is greater. The percentage of particles in the atmosphere of Greenland is among the lowest hitherto recorded. *Subject Headings:* **Atmospheric pollution, Greenland.** —*I.L.D.*

2.1–65 551.510.5

Arnquist, Warren N., **Upper atmosphere symposium and conference.** *Science*, 112(2902): 183–184, Aug. 11, 1950. **DLC**—Discussion of activities at the conference held at California Institute of Technology in Pasadena on May 15, 1950, followed by a two day conference on the same subject at the Naval Ordnance Test Station at Inyokern, California. Nine papers were read on subjects such as: the aurora, night sky emission, ionized layers, cosmic rays, etc. Many top scientists from the United States and abroad attended. *Subject Headings:* **Upper atmosphere research, Symposia.**—*M.R.*

2.1–66 551.510.5:551.524.4

Feĭgel'son, E. M., **Raspredelenie temperatury zemnoĭ atmosfery po vysote pri nalichii luchistogo i vertikal'nogo turbulentnogo teploobmena.** [Vertical temperature distribution of the earth's atmosphere under conditions of radiant and vertical turbulent heat exchange.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 14(4):359–382, July–Aug. 1950. 5 figs., 7 tables, 12 refs., 57 equations. **DLC**—A theoretical solution of the problem of the vertical temperature gradient in the atmosphere by means of successive approximations of the

equations of radiative heat exchange taking into account the turbulent transfer of heat, as well as radiative diffusion of energy. The long wave radiation due to the presence of water vapor, and a calculation of the optical thickness of the atmosphere, are introduced. Tables and curves show the difference between the results obtained for the daytime temperature profile in the lower 10 km. by several methods. The results of the first approximation (Chandrasekhar) are much too low, whereas, each succeeding approximation gives higher temperatures for all levels. *Subject Headings:* **Structure of the atmosphere, Vertical temperature gradient, Radiation balance.**—*M.R.*

2.1–67 551.510.534

†*Craig, Richard A., **The observations and photochemistry of atmospheric ozone and their meteorological significance.** *American Meteorological Society, Meteorological Monographs,* 1(2), Sept. **1950.** 50 p. 18 figs., 4 tables, 119 refs., append. (with 36 tables and equations). **DWB**—The most comprehensive treatment of the problem of ozone in the free atmosphere in the English language. (Monograph of the *Deutscher Wetterdienst in the US-Zone, Berichte,* entitled **Ozon,** *see item* 5–31 *Meteorological Abstracts and Bibliography,* 1(5), May 1950.) After a brief history of significant research there is a thorough discussion and analysis of observational data with respect to latitude, season, altitude, temperature, air mass and frontal conditions and year. Variations in solar altitude, solar constant, temperature, etc. on the ozone concentration and photochemistry of the ozone layer are treated next. Then the causes of daily, seasonal and annual variation are considered. Lastly, there is a thorough bibliography and appendix containing a large amount of data gathered in various parts of the world, and constants derived therefrom. *Subject Headings:* **Ozone, Ozone variations.**—*M.R.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

2.1–68 551.511

Čadež, M., **O pretvaranju energije u atmosferi.** [On the formation of energy in the atmosphere.] Izdan'a Savezne uprave Khidrometeoroloshke sluzhbe pri Vladi FNRJ, Rasprave i studije, 2, Belgrade, **1949.** 30 p. 11 figs., 15 refs., 91 equations. French summary p. 28–30. **MH-BH**—A comprehensive paper on the mechanism by which energy is absorbed by the atmosphere and transformed into circulation, wave motion, vertical motions, etc. Both mechanical and thermodynamical processes (including the role of water vapor) are considered in detail. Theoretical treatment is predominant. *Subject Heading:* **Thermodynamics of the atmosphere.**—*M.R.*

2.1–69 551.511:551.515

Gião, Antonio, **Le problème atmosphérique d'après la théorie des perturbations spontanées.** [The problem of atmospheric discharges in connection with the theory of spontaneous perturbations.] *Portugaliae Physica, Lisbon,* 2(3):203–234, **1947.** refs. (in footnotes), 81 equations. (Reprint available.) **MH-BH**—Mathematical solution of various problems of planetary circulation and the formation of cyclones in the earth's atmosphere. The systems are then extrapolated by determination of the forecast vectors $\vec{H}$ and $\vec{A}$ and these vectors discussed in relation to dynamic climatology. Finally, there is a general solution of the perturbation equations. *Subject Headings:* **Atmospheric disturbances, Dynamics of the atmosphere.**—*M.R.*

2.1–70 551.511:551.551

Ogiwara, Sekiji, **The vertical transfer of heat and the change of air temperature by turbulence.** *Tôhoku University, Science Reports, 5th Ser., Geophysics,* 2(1):44–47, March **1950.** fig., ref., 14 equations. In English. **MH-BH**—The author attempts to improve on G. I. Taylor's formula for expressing turbulent heat transfer by taking into consideration the transfer of mass due to change in pressure gradient as lapse rate changes. Results compared with Taylor's when applied to data for Lindenberg and the Grand Banks (Newfoundland). Conclusion is that K is constant only below 500 m., and increases with height when Taylor's formula is used; but the author's K is constant to great heights. *Subject Headings:* **Heat exchange, Turbulence.**—*M.R.*

2.1–71 551.511:551.594.11

Yriberry, A. J. (S. J.), **Gradiente de potencial atmosférico negativo concielo despejado.** [Negative atmospheric potential gradient during clear weather.] *Institutos de Investigación de San Miguel, Argentina, Acta Scientifica,* **1950.** 6 p. 8 refs. **MH-BH**—During Dec. 1949 and Jan. 1950 a very intense and prolonged period of negative electric field occurred during clear skies. Wind speed, direction, relative humidity and dust are discussed with respect to this phenomenon and its cause. *Subject Headings:* **Dynamics of the atmosphere, Potential gradient, Argentina.**—*M.R.*

GENERAL CIRCULATION

2.1–72 551.513:551.588.2

Colson, DeVer, **Effect of a mountain range on quasi-stationary waves.** *Journal of Meteorology,* 7(4):279–282, Aug. **1950.** 3 figs., table, 2 refs., 4 equations. **MH-BH**—An extension of the theoretical development performed by the author on the same subject (*American Geophysical Union, Trans.,* 30:818–830, 1949) to include cases where the air current to the windward of the mountain range varies systematically from the uniform westerly flow previously assumed. Pressure profiles are computed for each case, the average being the same as that for a steady westerly current. *Subject Headings:* **Waves in the westerlies, Orographic effects.**—*M.R.*

2.1–73 551.513:551.509.33

†Di Benedetto, Felice, **Le correnti occidentali e le loro perturbazioni.** [The westerly winds and waves in the westerlies.] *Rivista di Meteorologia Aeronautica,* 10(1):3–17, Jan.–March **1950.** 9 figs., table, 26 refs., 3 equations. Italian, French, English, and German summaries p. 3. **MH-BH**—A systematic summarization of recent theoretical works on the origin of the westerlies and long waves in the westerlies. Particular mention is made of the works of Rossby, Bjerknes, Namias, Haurwitz, Queney, Charney and others. The development of the theory of long waves in the westerlies and its application to long range forecasting, is traced by means of a review of recent works of Queney. In addition, there is a summary of the mathematical aspects and mean charts for the Northern Hemisphere to illustrate the synoptic aspects. *Subject Headings:* **Waves in the westerlies, Long range forecasting.**—*M.R.*

2.1–74 551.513:551.556:551.453(57)

†Fedorovich, B. A., **Rel'ef peskov Azii kak otobrazhenie protsessov tsirkuliatsii atmosfery.** [Relief of Asian sands as a reflection of the atmospheric circulation.] *Problemy Fizicheskoĭ Geografii,* 13:91–109, **1948.** fold. map, 34 refs. **DLC**—The form, structure, distribution and orientation of the sand relief of the Asian deserts extending from Prikaspiia to the border of Korea are described and analyzed in relation to the prevailing wind regime of the lower atmospheres and to the general atmospheric circulation. The sand relief reflects the characteristics of the wind regime and of the general atmospheric circulation. The article contains a map of the sand relief of the Asian deserts and an extensive bibliography. *Subject Headings:* **General circulation, Wind effects, Deserts, U.S.S.R.**—*I.L.D.*

2.1–75 551.513

Priestley, C. H. B., **On the dynamics of the general atmospheric circulation,** *Australian Journal of Scientific Research, Ser. A, Physical Sciences,* 3(1):1–18, **1950.** fig., 5 tables, 19 refs., 12 equations. (Reprint available.) **MH-BH**—An important paper developing the theory of zonal circulation and the *jet stream* to explain the evident poleward drift across isobars at high levels (and partial counterdrift at low levels). Such drifts seem to occur in the latitudes just outside the tropics, where the *jet stream* is the most pronounced (when it occurs) and are associated with strong vertical wind shear on the equatorial side of the jet. The poleward drift is evaluated in terms of fluctuations in the zonal index and the strength and latitude of the *jet stream.* Finally, Rossby's (1947) theory of planetary circulation based on mixing length concepts is applied quantitatively, using Willett's (1948) data. *Subject Headings:* **Atmospheric circulation, Dynamics of the atmosphere, Jet stream, Transfer of momentum.**—*M.R.*

2.1–76 551.513 551.557:551.558.2

Starr, Victor P., Riehl, H., and Yeh, T. C., **The meridional transport of angular momentum in the atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 76(330):492–495, Oct. **1950. MH-BH**—Correspondence about paper by Riehl and Yeh in *Quarterly Journal*, April 1950 (*see item* 6–40, *Meteorological Abstracts and Bibliography*, 1(6), June 1950). *Subject Headings:* **Atmospheric circulation, Meridional circulation, Energy transport.**

2.1–77 551.513.1:551.542.1

§Neumann, Ernst, **Die Rolle der Zirkulationsleistung und der horizontalen Strömungsdivergenz bei der Westwetterlage vom 14.–16. Februar 1935.** [Role of the change of circulation and of horizontal divergence during "west weather" situations of Feb. 14–16, 1935.] *Reichsamt für Wetterdienst, Wissenschaftliche Abhandlungen*, 4(6), **1938.** 19+p. 14+figs., table, 9 refs., equations. **DLC**—A theoretical analysis, of the rate of change of circulation as a function of variations in the pressure gradient, based upon the work of G. Stüve and R. Mügge. Conditions in troposphere and lower stratosphere causing changes in pressure gradient are discussed. The role of divergence in vertical motion is considered. Actual observations during a given weather situation are compared with gliding motion determined theoretically from the rate of change of circulation and the divergence principle. The author concludes that during actively steered and variable weather, divergence influences vertical movement more than does the change of circulation. *Subject Headings:* **General circulation, Divergence, Pressure gradient, Germany.**—*I. L. D.*

2.1–78 551.513.1:551.46

Shuleĭkin, V. V., **Teplovye vzaimodeĭstviia mezhdu okeanom, atmosferoĭ i materikom.** [Thermal interaction between the ocean, atmosphere and continent.] Akademiia Nauk, SSSR, IUbileĭnyĭ Sbornik, posviashchennyĭ 30 letiiu Velikoĭ Oktiabr'skoĭ Sotsialisticheskoĭ Revoliutsii, Pt. I, p. 423–442, **1947.** 13 figs. **DLC**—The author describes and illustrates, by means of graphs and anomaly charts, the latest concept of the interrelation between the heat balance of the sea, the atmosphere above the sea and the continents (with special attention to the North Atlantic and Europe). Investigations in the polar regions and aerological observations made it possible to compute the quantitative characteristics of the elements of heat balance, pressure gradients and the speed of monsoon circulation. A theory is presented to explain the complicated processes of exchange of water masses in the ocean. *Subject Headings:* **General circulation, Energy exchange, Oceanography.**—*M. R.*

ATMOSPHERIC DISTURBANCES

2.1–79 551.515

Sumner, E. J., **The significance of vertical stability in synoptic development.** *Royal Meteorological Society, Quarterly Journal*, 76(330):384–392, Oct. **1950.** fig., table, formulas. **MH-BH**—Author calculates that in middle latitudes the damping by vertical stability is not important in depressions and anticyclones exceeding 2000 km. diameter but becomes so in systems less than 1000 km., where speed of development in a neutral atmosphere may exceed 10 times that in a stable one. A very small degree of instability in depth permits rapid small-scale cyclonic development. Damping is inversely proportional to square of Coriolis parameter and in latitudes less than 10° cyclones can only develop in vertically unstable air. *Subject Headings:* **Cyclogenesis, Instability.**

2.1–80 551.515.1:551.509.3

§Thompson, C. E., **Cold lows affecting Alberta in summer (June–Sept.)** *Canada, Meteorological Div., Dept. of Transport, Cir*-1813, *Tec*-76, July 3, **1950.** 8 leaves. 4 charts, 9 refs. **MH-BH**—Cold lows (closed isobars at 500 mb. level) occur most frequently in summer over the Canadian Prairies, producing some of the heaviest precipitation known in that area. Two types were found during the months of June–Sept. 1947–1949. Sample surface and 500 mb. synoptic charts for June 30, 1949 and Sept. 7, 1947 show relation of precipitation patterns to cold low and orography. *Subject Headings:* **Cold lows, Anticyclogenesis, Forecasting cold lows, Alberta, Canada.**—*M. R.*

2.1–81 551.515.1:551.461.2

Tomczak, Gerhard, **Die Sturmfluten vom 9. und 10. Februar 1949 an der deutschen Nordseeküste.** [The storm surges of 9 and 10 Feb. 1949 on the German North Sea coast.] *Deutsche Hydrographische Zeitschrift*, 3(3–4):227–240, **1950.** 11 figs., 4 tables (fold. part in pocket), 14 refs. German and English summaries p. 227–228. **DWB**—The winter of 1948/9 brought numerous storm floods. On Feb. 9–10 tide gages showed water levels up to 2½ meters above normal high water at Husum, during passage of a small deep depression across southern North Sea. Surface weather charts are given for 3 hour intervals, also barograms and pressure-tube anemogram (max. gust at List/Sylt exceeded 40 m./sec.). The effect of air pressure and wind masked ordinary tides. A pressure difference of 25 mb. between Yarmouth and Blaavandshuk can raise high water level by 4 meters. *Subject Headings:* **Barometric depressions, Storm tides, North Sea.**—*C.E.P.B.*

2.1–82 551.515.2(75)

Cameron, D. C., **Open season on hurricanes.** *Weatherwise*, 3(5):108–109, 118, Oct. **1950.** map. **MH-BH**—Six hurricanes occurred in the West Indies and Atlantic Coast (of U. S.) area during five weeks from mid-August to mid-September 1950. Cameron gives a brief description of outstanding features of each in turn and shows tracks and locations each day on a chart of the area. *Subject Headings:* **Hurricanes, South Atlantic States.**—*M.R.*

2.1–83 551.515.2

Pickard, T. W., **Typhoons of the China Seas.** *Weather*, 5(10):335–338, Oct. **1950. DWB** —Personal experiences of a ship's captain on the China coast. *Subject Headings:* **Typhoons, China Seas.**

2.1–84 551.515.23:551.509.3

§Riehl, Herbert and Burgner, Newton M., **Further studies of the movement and formation of hurricanes and their forecasting.** *American Meteorological Society, Bulletin*, 31(7):244–253, Sept. **1950.** 8 figs. (incl. synoptic charts), 13 refs. **MH-BH**—The relation between the motion of tropical storms and the steering current is investigated quantitatively. The steering current is defined in space as a belt of 5 degrees extending 2½ degrees south and 2½ degrees north of the storm center, vertically in the troposphere from sea level to 300 mb. and 45 degrees east to 45 degrees west of the storm center; the time unit was 5-day averages. A correlation of 0.87 is established between zonal speed of the steering current and the zonal component of the motion of the storms. There was some scatter about the linear regression line. The development of tropical storms is explained and it is shown that the progression of long waves frequently precedes deepening. The model developed by the author for describing the mechanism of cyclonic formations is applied to a specific example of hurricane formation. *Subject Headings:* **Hurricane tracks, Hurricane formation, Hurricane forecasting.**—*I.L.D.*

2.1–85 551.515.3

Bonney, R. G., **Waterspouts, Caribbean Sea.** *Marine Observer*, 20(150):194–195, Oct. **1950.** 6 figs. **DWB**—Sketches of twin spouts. *Subject Headings:* **Waterspouts, Caribbean Sea.**

2.1–86 551.515.4:06(41/2)

Bower, S. Morris, **Recent work of the Thunderstorm Census Organisation.** *Royal Meteorological Society, Quarterly Journal*, 76(330):455–465, Oct. **1950.** 6 figs. Discussion of this and of paper by J. Forrest (p. 277), *ibid.*, p. 465–479. 9 figs. **MH-BH**—Definition of a day with thunderstorm as a day on which thunder is heard blurs detail and is replaced by "day with overhead thunderstorm." Distribution in 1949 charted and method of plotting daily records, including isochrones and damage areas, illustrated. Graphic seasonal and annual summation, and county surveys, explained. The discussion concerned estimation of severity of storms by damage to transmission lines, and comparison of frequency of thunderstorms and grid faults. *Subject Headings:* **Thunderstorm distribution, Great Britain.**

2.1–87 551.515.4:551.594.221:629.13

†*Harrison, L. P., **Lightning discharges to aircraft and associated meteorological conditions.** Washington, D. C., *U. S. N.A.C.A., Technical Note,* No. 1001, May **1946.** 149+p. 13 figs., tables, 33 refs., 7 append., biblio. p. 148–149. **MH-BH**—This report was intended primarily to be a technical report for pilots or aeronautical engineers on lightning damage to aircraft in flight. However, the material presented comprises one of the most comprehensive and analytical summaries ever made of the theoretical and empirical aspects of lightning, turbulence, and thunderstorm frequency and distribution which would be of interest to the meteorologist or forecaster. The body of the report follows a logical arrangement and the statements or conclusions are amply supported by summary or analytical tables and photographs. The first few chapters take up the geographical, annual, diurnal, elevation and temperature variations of lightning discharges, respectively. Then cloud and thunderstorm, precipitation, turbulence and convective conditions associated with cases of lightning strikes to aircraft are presented.

Next comes an analysis of air mass, cloud and associated synoptic conditions, with data on the frequency of meteorological situations contributing to the cases of lightning strikes cited. St. Elmo's fire is discussed both in theory and from observations made by pilots. Several chapters cover the technical aspects of path of discharge through the plane, effect of trailing antennae and static discharge wire, and the location of burn marks or damage. The physical and psychological effects on pilots are discussed at some length. Finally, the electric field in a thundercloud, the mechanism of the discharges initiated by aircraft and recommendations for avoiding or reducing harmful effects of sparks, discharges, turbulence or other severe meteorological conditions are presented.

In the appendices (p. 97–143) a wealth of material is presented on the meteorological conditions associated with thunderstorms, the theory of the generation and separation of charges in thunderstorms, and the nature of lightning. In particular, this section covers the phenomena involved in the initiation, development and decay of thunderstorms, and a discussion of physical processes taking place in cumulonimbus clouds. Perhaps an up-to-date revision of this work could be presented in some form which would attract more attention and receive wider dissemination. In the appendix is also to be found a glossary of important meteorological terms; a chronological list of the 169 cases (1935–1944) of strikes analyzed in this report, with the date, temperature, altimeter reading and height above ground; a list of 33 references cited and a bibliography of 21 important works in this field. *Subject Headings:* **Lightning, Thunderstorms, Turbulence, Aircraft damage, Flight procedure, United States.**—*M.R.*

2.1–88 551.515.8:551.557:551.577

Craddock, J. M. and Pritchard, D., **Use of the hodograph in estimating the rainfall at fronts.** *Meteorological Magazine, London,* 79(940):288–292, Oct. **1950.** 5 figs. **MH-BH**—Referring to article by A. E. Parker, *Meteorological Magazine,* 78:247–258, 1949, authors compared rainfall in N. Ireland with upslope motion at warm fronts estimated from shear in the wind component normal to the front (a) in the 100 mb. layer above the cold air, (b) in the layer between the cold air and 400 mb. Both showed a loose positive correlation, enough for a qualitative forecast. A similar investigation in warm air preceding a cold front gave no useful result. Note by Parker p. 292. *Subject Headings:* **Fronts, Upper air winds, Precipitation measurements.**

2.1–89 551.515.8:550.342

Lynch, J. Joseph, **An investigation of two-second microseisms associated with cold fronts and a new method for tracking the cold front center.** *American Geophysical Union, Transactions,* 31(4):525–528, Aug. **1950.** 3 figs., ref. **MH-BH**—Two tripartite stations, each consisting of three two-second horizontal seismographs recording at a speed of 600 mm./min. and three stations equipped with two-second vertical and horizontal instruments were set up. The orientation of these stations is illustrated by a diagram and the manner of taking records is described. During the passage of a cold front there was obtained evidence that a microseismic source exists southwest of New York City and that there are identifiable wave trains between two stations six miles apart. The author presents "a new method of recording microseisms on

an oscilloscope and reading the time differences of each pair of stations along the axis of the observed Lissajous ellipse." *Subject Headings:* **Cold fronts, Microseisms.**—*I.L.D.*

2.1–90 551.515.8:551.582(624)

Soliman, K. H. and El-Fandy, M. G., **Summer weather in the Sudan.** *Royal Meteorological Society, Quarterly Journal*, 76(330):488–490, Oct. **1950.** 2 figs. **MH-BH**—Correspondence about paper by El-Fandy, *Quarterly Journal* 1949, p. 375 (*see item* 2–96, *Meteorological Abstracts and Bibliography*, 1(2), Feb. 1950). *Subject Headings:* **Thunderstorms, Climatology, Sudan.**

2.1–91 551.515.81:551.524

Kunits, A. V., **O vliianii advektsii v svobodnoĭ atmosfere na temperaturnuiu stratifikatsiiu vozdushnykh mass.** [The influence of advection in the free atmosphere on the temperature stratification of air masses.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 14(1):82–88, Jan.–Feb. **1950.** 3 figs., tables, 2 refs., 7 equations. **DLC**—The author claims that, in spite of Petterssen's conclusion regarding advection of air aloft (Weather Analysis and Forecasting, 1940), if the horizontal temperature gradient is constant (but high), the geostrophic air motion *cannot* produce an appreciable local change in lapse rate. However, if the horizontal gradient varies with height, local changes *can* occur. *Subject Headings:* **Vertical temperature gradient, Advection, Geostrophic winds.**—*M.R.*

RADIATION AND TEMPERATURE

RADIATION

2.1–92 551.521:84

Dobosi, Zoltán, **A mikroklimatikus sugárzásmérés új módszere.** [A new method in the measurement of radiation in microclimate.] A Pázmány Péter Tudományegyetem Légkörtani és Eghajlattani Intézetének Kiadványai [Publications of the Meteorological and Climatological Institute, Pázmány Péter University], Budapest, No. 2:39–46, **1948.** fig., equations. English translation by author p. 47–54. **MH-BH**—Since a plant receives radiation from all directions, a new definition of intensity of radiation must be introduced in order to measure radiation on a micrometeorological scale. Intensity of radiation is given by the number of gram calories per minute incident upon a spherical surface having a projection of 1 cm.^{2} in any direction; radius of this sphere is $r=\frac{1}{\sqrt{\pi}}$. A modified insolation thermometer, consisting of a black and a white bulb thermometer enclosed in a glass sheath, is proposed for measuring radiation intensity. The relationship between radiation intensity and temperatures of thermometers is analyzed theoretically by means of radiational heat balance. Radiation intensity is measured by means of the temperature difference between the black and white bulb thermometers and by temperature of the white bulb thermometer. The calibration of the instruments is described. *Subject Headings:* **Radiation measurement, Thermometers, Microclimatology.**—*I.L.D.*

2.1–93 551.521.1:63

Crabb, George A., Jr., **The normal pattern of solar radiation at East Lansing.** *Michigan Agricultural Experiment Station, Journal*, Article No. 1144 [March 24, 1950]. 5 p. 4 refs. Presented before the Geographic Section, 54th Annual Meeting of the Michigan Academy of Science, Arts and Letters, March 24, 1950, at Ann Arbor, Michigan. At head of title: United States Dept. of Agriculture Soil Conservation Service [East Lansing, Michigan]. **MH-BH**—Five years of solar radiation data for East Lansing, Michigan were smoothed and averaged to determine the normal pattern of daily radiation available for plant growth. Compared with 92 other stations, Lansing showed lower annual totals than any other station except Fairbanks, Pittsburgh, Chicago and New York. (The three latter are affected by atmospheric pollution.) A singularity exists from April 25 to May 20, not evident in other records. Lower radiation at this season has a marked effect on tomato and apple development. *Subject Headings:* **Solar radiation, Agricultural meteorology, East Lansing, Michigan.**—*M.R.*

2.1–94 551.521.1:550.38

Hoyle, Fred, **Some recent researches in solar physics.** Cambridge, England, University Press, **1949.** 134 p. 8 figs., 36 tables, refs., 2 append. (Cambridge Monographs on Physics.) **MH-BH, DLC**—A technical treatise intended for the astrophysicist and concerned mainly with the theoretical aspects of solar physics and solar terrestrial relationships. Separate chapters include a discussion of: (1) sunspots and the solar cycle (11 years), (2) observational data and (3 and 4) theory of the chromosphere and corona, (5) the magnetic field and convective circulation of the sun, (6) terrestrial magnetic storms, the aurora and the earth's ionosphere, and finally, (7) the emission of radio waves from the sun. Appendices and supplementary notes include material on nomenclature and symbols, the origin of the solar magnetic field and the aurora. *Subject Headings:* **Astrophysics, Solar physics, Terrestrial magnetism.**—*M.R.*

2.1–95 551.521.1:551.586:638

Strel'nikov, I. D., **Znachenie solnechnoĭ radiatsii i vzaimodeĭstviia fiziko-geograficheskikh faktorov v ekologii zhivotnykh razlichnykh landshaftov.** [Significance of solar radiation and the interaction of physical geographical factors on the ecology of animals of diverse physiogeographic zones.] *Problemy Fizicheskoĭ Geografii*, 13:145–155, **1948.** 4 figs., 20 refs. **DLC**—The author discusses the heating effect of solar radiation upon plants and particularly upon poikilothermic animals, the mitigating influences of wind and evaporation upon the rise of body temperature and the comparative effect of direct and indirect solar radiation in the ecology of animals of diverse physiographic regions. Solar radiation raises the body temperature of insects 8° to 34°C. above the temperature of the ambient air and its heating influence is greater, the lower the air temperature. The body temperature of diurnal and nocturnal insects during flight ranges between 35°–38°C. and is independent of air temperature and of time of day. Mean body temperature of poikilotherms in different physiographic regions under the influence of solar radiation ranges between 30° and 42°C. *Subject Headings:* **Bioclimatology, Solar radiation, Insects.**—*I.L.D.*

2.1–96 551.521.3:551.593.7

Cialdea, Renato, **La distribuzione spettrale della polarizzazione della luce del cielo.** [The spectral distribution of the polarized light of the sky.] *Annali di Geofisica*, 3(3):357–370 July **1950.** 5 figs., 7 refs., 17 equations. **MH-BH**—Deals with the experimental and theoretical work of Kalitin and Tichanowsky on the relationship between wave length and polarization of the light of the sky. The author analyzes theoretically the spectral distribution of the polarized light of the sky taking into consideration both the effect of molecular diffusion, and of large centers of diffusion. The theoretical formulas derived are in good agreement with the experimental data of Kalitin. Polarization is shown to be influenced by the thickness of the diffusing layer. *Subject Headings:* **Light dispersion, Polarization.**—*I.L.D.*

2.1–97 551.521.3

Kaplan, Lewis D., **Line intensities and absorption for the 15-micron carbon dioxide band.** *Journal of Chemical Physics*, 18(2):186–189, Feb. **1950.** 5 tables, refs., 18 equations. (Reprint available.) **DLC**—Thorndike's value of 560×10^{10} cycles per centimeter-atmosphere for the total intensity of the 15-micron CO_2 band is used to calculate the line intensities at one atmosphere and 300°K. Calculation of absorption results are in good agreement with published absorption curves by Martin and Barker. Absorption for 203 mb. and 218°K is recalculated, correcting previous errors and using better approximation. *Subject Headings:* **Absorption, Carbon dioxide.**—*From author's abstract.*

2.1–98 551.521.3

*Sato, Takao, **Studies on the scattering of the sun's light by the earth's atmosphere.** *Tôkoho University, Science Reports, 5th Ser., Geophysics*, 2(1):1–26, March **1950.** figs., 12 tables, equations. In English. **MH-BH**—The author presents a detailed solution of the theoretical formula for global (whole sky) radiation, taking into consideration both primary and secondary scattering. Berlage's formula (1928) considers secondary scattering zero when the sun is at the zenith. Tables and nomograms are compiled and presented for total and partial sky radiation at various solar angles and from various portions of the sky. The

results agree very well with actual observations but are in every case higher (for global radiation) than Berlage's values. Methods of evaluation of data from a Gorczynski pyranometer are described. *Subject Headings:* **Scattering, Global radiation, Nomograms.**—*M.R.*

2.1–99 551.521.3:551.593.62:551.593.7

Shifrin, K. S., **Rasseianie sveta na krupnykh kapliakh vody i poliarizatsiia sveta v radugakh.** [The scattering of light by large drops of water and the polarization of the light from the rainbow.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 14(2):128–163, March–April **1950.** 7 figs., 5 tables, 5 refs., 29 equations. **DLC**—The methods of geometrical optics and Fresnel's formulas are used and calculations made for multiple internal reflections up to eight in number. Polar diagrams and detailed tables are given for the intensity of the light scattered at one degree intervals from the direction of the incident beam. In the case of the rainbow, the geometrical theory gives infinite intensity in the direction of the bow but the degree of polarization is obtained quite definitely. *Subject Headings:* **Scattering, Rainbows.** —*M.R.*

2.1–100 551.521.4:551.594.5

Currie, B. W., **Night sky brightness at latitude 52°.** *American Geophysical Union, Transactions*, 31(4):539–540, Aug. **1950.** table, 3 refs. **MH-BH**—Observations of the night sky brightness at Saskatoon, Canada, latitude 52°11′N, were made under a variety of ground, atmospheric and sky conditions. They indicate that the brightness on clear nights without visible polar aurora is appreciably greater than at lower latitudes. Large differences between the average brightness for nights without apparent differences in sky and atmospheric conditions, a seasonal variation in the average brightness corresponding approximately to the seasonal occurrence of the polar aurora, and observations of sky luminosities when polar aurora is present suggest that this increase in brightness is caused by light of polar auroral origin. *Subject Headings:* **Light of the night sky, Auroras, Saskatoon, Canada.**—*From author's abstract.*

2.1–101 551.521.4

Dufay, Jean, **Spectre du ciel nocturne dans le proche infrarouge.** [Spectra of the night sky in the near infrared.] *Annales de Géophysique*, 5(3):183–187, July–Sept. **1949.** fig., 2 tables, 10 refs. **MH-BH**—The spectrum of the night sky between 7500 and 9000 Å has been photographed with short exposures by means of a prism spectrograph. The spectrum is continuous but crossed by telluric lines and by very intense lines of unknown origin with a wave length greater than 8300 Å. *Subject Heading*: **Light of the night sky.**—*I.L.D.*

2.1–102 551.521.4

Pearson, C. A. and Koomen, M. J., **Night sky brightness in Maryland and Greenland during 1949.** *American Geophysical Union, Transactions*, 31(4):545–546, Aug. **1950.** 2 refs. **MH-BH**—Visual measurements of night sky brightness were made from stations located north of the equator by means of a photometer using a radium activated luminous phosphor button. The measured brightness refers mainly to the visible radiations from the permanent aurora originating in the upper atmosphere and is a function of altitude above the horizon. No important changes with latitude were observed; but night-to-night and long term fluctuations were revealed. A correlation between fluctuations of night sky brightness and long term trends of solar coronal indices, as observed at Climax, Colorado has been found. *Subject Headings:* **Light of the night sky, Maryland, Greenland.**—*I.L.D.*

2.1–103 551.521.4

Wilcox, John B., **A survey of night sky brightness at College, Alaska.** *American Geophysical Union, Transactions*, 31(4):541–544, Aug. **1950.** 2 figs., 2 tables, 3 refs. **MH-BH**—Determinations of night sky brightness were made by means of the NRL Photometer Model 2, No. 3, on clear, moonless nights on both the presence and absence of visible auroras. The data, presented in tables, are compiled as mean values of brightness in mL for specific points in the night sky over a period of several weeks. A brightness contour map of the compiled data is presented. *Subject Headings:* **Light of the night sky, College, Alaska.**—*I.L.D.*

2.1–104 551.521.4

†Yamamoto, Gi-ichi, **On nocturnal radiation.** *Tôhoku University, Science Reports, 5th Ser., Geophysics*, 2(1):27–43, March **1950.** 11 figs., 6 tables, 32 refs., 41 equations. In English. **MH-BH**—Various theoretical formulas for downward radiation are discussed and evaluated quantitatively. Experimental data on absorption due to water vapor, CO_2 and O_3 are compared with the theoretical. The author's absorption coefficient for water vapor is introduced into the calculation, giving results which he claims are in good agreement with observations. *Subject Headings:* **Nocturnal radiation, Radiation balance.**—*M.R.*

2.1–105 551.521.61:551.557

†Prudhomme, André, **Le spectre d'absorption infrarouge de la vapeur d'eau au point de vue de ses applications atmosphériques.** [Infrared absorption spectrum of water vapor and its atmospheric application.] *Annales de Géophysique*, 5(3):236–247, July–Sept. **1949.** 108 refs., equations. **MH-BH**—The first part of this article is concerned with the theoretical and experimental data of the infrared absorption spectrum of water vapor. It contains a discussion of the bands and lines of the infrared absorption spectra produced by humid air and water vapor under laboratory conditions, the bands and lines produced by water vapor in the atmosphere, the calculation of the coefficient of absorption and the effect of pressure and temperature upon the width of the lines. The second half deals with the application of the infrared absorption spectrum of water vapor to atmospheric studies. The determination of the amount of precipitable water in the atmosphere and the total emission and absorption of water vapor in the atmosphere are considered. *Subject Headings:* **Infrared absorption spectrum, Water vapor.**—*I.L.D.*

2.1–106 551.521.63:551.506.5

*Rodionov, S. F., **Prozrachnost' atmosfery v ul'trafioletovoĭ oblasti spektra.** [Transparency of the atmosphere in the ultraviolet part of the spectrum.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 14(4):334–358, July–Aug. **1950.** 17 figs., 8 tables, 19 refs., 18 equations. **DLC**—A method of determining the anomalous increase in transparency of the atmosphere to ultraviolet light from the sun, by direct readings taken with a sensitive electrophotoelement, was worked out by the author during the Elbrus Expedition (1934–35). The equipment, theory and control experiments to eliminate possibility of errors due to scattering in the instruments or refraction in the air, are described. Additional measurements made during 1936, 1937 and 1949 at high altitudes are analyzed and presented. Comparison of the author's "anomalous transparency" to wave lengths of 3100–2900Å (or lower) with the "Umkehr Effect" of Götz and Dobson, shows remarkable similarity. Selective effect of aerosols and ozone on oblique ultraviolet rays of sun considered. An important study based on 20 years of investigations in theoretical radiation and on observations made at stations up to 4250 m elevation and to 5.5 km. in the free air. *Subject Headings:* **Ultraviolet light, Anomalous transparency, Elbrus Expedition, U.S.S.R.**—*M.R.*

TEMPERATURE

2.1–107 551.524.3

Ives, Ronald L., **Sunrise temperature dips.** *American Geophysical Union, Transactions*, 31(4):536–538, Aug. **1950.** 2 figs., 2 refs. **MH-BH**—Temperature dips of as much as 5 degrees occur in the Great Basin and Rocky Mountain region, during the hour centered about sunrise. They appear to be related to valley air drainage and are accompanied by a barometric oscillation. The temperature dip is greatest at low levels, one to three inches above the ground, and diminishes with altitude. The sunrise temperature dips may produce errors in mean temperatures as conventionally compiled and lead to possible readjustments of thermographs. *Subject Headings:* **Temperature variations, Drainage, North America, Western United States.**—*I.L.D.*

2.1–108 551.524.31

Berliand, O. S., **Utochnennaia teoriia sutochnogo khoda temperatury vozdukha s uchetom izmeneniia koeffitsienta turbulentnoĭ teploprovodnosti v techenie sutok.** [An exact theory

of the diurnal variation in air temperature, considering the diurnal variation in the coefficient of turbulent diffusion of heat.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 14(1):70–81, Jan.–Feb. **1950.** 2 figs., 3 tables, 4 refs., 35 equations. **DLC**—The differential equations of eddy diffusion of heat are solved and the solution presented step by step. It is assumed that the coefficient of turbulent heat transport is a linear function of height and time of day or night. Radiant heat exchange is ignored in this solution. *Subject Headings:* **Eddy diffusion, Turbulent exchange.**—*M.R.*

2.1–109 551.524.36:551.509.31

§Lennahan, Charles M. and Norton, Lewis C., **Low minimum temperatures in North Central United States, July 13, and 14, 1950.** *Monthly Weather Review*, 78(7):128–133, July **1950.** 16 figs. (incl. 10 synoptic charts.) **MH-BH**—A brief synoptic aerological study of a situation which produced record or near record low temperatures over Minnesota, Wisconsin, etc. Cold air flow from the Arctic to the Gulf followed the eastward movement of a deep cold low from Vancouver Island to Hudson Bay. *Subject Headings:* **Temperature extremes, Synoptic studies, North Central States, Mountain States.**—*M.R.*

2.1–110 551.524.36

von Rudloff, Hans, **Heisse und lange Sommer und darauffolgende Winter in Deutschland, Teil I.** [Hot and long summers and the following winters in Germany, Pt. I.] *Zeitschrift für Meteorologie*, 4(1–2):48–52, Jan.–Feb. **1950.** 8 tables, 7 refs. German summary to Pts. I–III p. 51–52. **Temperatur- und Niederschlagsabweichungen in Deutschland in langen und heissen Sommern und den darauffolgenden Herbst- und Wintermonaten. Teil II.** [Temperature and precipitation deviation of long and hot summers and the following autumn and winter months in Germany. Pt. II.] *Ibid.*, 4(4–5):119–125, April–May 1950. 7 tables, 3 refs. **Heisse und lange Sommer und relative Häufigkeit der darauffolgenden milden und kalten, trockenen und niederschlagsreichen Wintermonate in Deutschland. Teil III.** [Hot and long summers and the relative frequency of the following mild and cold, dry and wet winter in Germany. Pt. III.] *Ibid.*, 4(4–5): 126–130, April–May 1950. 6 tables, ref. **DLC**—It was found that after a definite succession of positive temperature anomalies in summer months, the following winter months also mostly show positive temperature anomalies. In Pt. I the mean temperature and rainfall departures of 40 selected summers and the following winters are considered as a whole, while in Pt. II the monthly temperature and precipitation anomalies and in Pt. III the frequencies of given temperature and precipitation anomalies are considered. The theme is treated on the basis of collections of individual stations. Six stations are selected as representative of different German land areas. *Subject Headings:* **Temperature anomalies, Germany.**—*Translation of author's summary.*

2.1–111 551.524.4:551.589

*Kirde, K., **Charakteristische Merkmale der Inversionsschichten.** [Characteristic features of inversion layers.] Contributions of Baltic University, No. 11, Hamburg, **1946.** 31 p. 30 tables, equations. English summary p. 31–[32]. **MH-BH**—A thoroughly analytical treatment of the character and frequency of surface inversions in the Baltic region (based on data for Hamburg, Germany and Utti, Finland). Synoptic charts are classified and the frequency of inversions determined for various rates of frontal movement or air mass type. Rainfall condensation levels, potential temperatures, heights and temperature of inversions are also correlated with inversions. *Subject Headings:* **Inversions, Synoptic climatology.**—*M.R.*

2.1–112 551.524.7

Bhatia, K. L. (New Delhi), **A comparison of Mt. Abu temperature observations recorded at 1700 hrs. I.S.T. with the free air temperatures over Jodhpur at the same level.** *Current Science, Bangalore*, 19(2):49–50, Feb. **1950.** 2 figs., 2 refs. **MH-BH, DLC**—The two stations are 115 miles apart and the time interval 3 hours between observations (2000 h. at Jodhpur and 1700 h. at Mt. Abu). No correction was applied since the diurnal variation at 1 km. in the free air is negligible. Frequencies of Δt are plotted by seasons, showing a marked peak for each season very close to the mean value for that season. The mountain is almost always

warmer than the free air in all but the monsoon months (July–Sept.) A previous comparison of 0800 h. (morning) temperatures for Cherat-Peshawar (30 miles apart) showed the reverse condition. At Mt. Abu, wet-bulb temperatures are higher over the mountain all year, but more so in fall and winter. Average corrections to be applied to mountain temperatures range from −5°F. to +1.5°F., wet-bulb −7°F. to −2.5°F., and relative humidity −15% to −5% during the seasons from winter to monsoon, respectively. *Subject Headings:* **Temperature, Mountain meteorology, Abu Mountain, Jodhpur, India.**—*M.R.*

PRESSURE AND WIND

PRESSURE

2.1–113 551.54:551.586:612

Zhikharev, S. S. and Prilezhaeva, T. S., **O nekotorykh izmeneniiakh krovi v usloviiakh vysokogornogo klimata.** [Blood changes in a mountain climate.] (In Trudy El'brusskoĭ Ekspeditsii Akademii Nauk, SSSR, i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny 1934 i 1935. [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, **1936.** p. 447–461. 7 figs., 3 tables, 19 refs. English summary p. 460–461. [*Ak. Nauk, SSSR, Komissiia po izucheniiu stratosfery*, Tom II.]) **DLC**—The erythrocyte count increases by 1 to 1.5 million per cubic millimeter at an elevation of 2300 m., but at higher elevations it increases more slowly. The erythrocyte count remained high for 1½ to 2 months after return to sea level. Immature erythrocytes increased in number with increase in altitude. The sedimentation rate of erythrocytes is at first accelerated at high altitudes; it gradually returns to normal and finally it is slowed down. *Subject Headings:* **Physiological climatology, Atmospheric pressure, Elbrus Expedition.**—*I.L.D.*

2.1–114 551.541:681.14 681:177

Macelwane, J. B., Brooks, E. M., Heinrich, R. R., and others, **Investigation of the nature and origin of micro-oscillations in the atmosphere.** [St. Louis], Saint Louis University, Institute of Technology, Aug. **1948.** 15 p. 13 figs., 4 refs. **DLC**—A brief report of work done under a Navy contract on the analysis of microbarometric records made all over North America in 1946, with Macelwane and Benioff microbarographs (using punched cards), and on the securing of new data at Bozeman, Montana and Florissant, Missouri (subterranean station). Expected results mentioned. Instruments, sites and records illustrated. *Subject Headings:* **Microbarometric oscillations, Punched card analysis, Microseisms, Seismographs.**—*M.R.*

2.1–115 551.543:551.577

Wagner, Walter, **Bemerkung zu "Luftdruckänderungen durch Niederschlag" von Dr. Hermann Noth.** [Remarks on "Air pressure changes through precipitation" by Dr. Hermann Noth.] *Meteorologische Rundschau*, 2(7–8):235–236, July–Aug. **1949.** ref., equations. **MH-BH**—Brief commentary. *Subject Headings:* **Pressure changes, Precipitation.**

2.1–116 551.547:629.13

Canada. Meteorological Div., Dept. of Transport, **Forecast procedure necessary to provide information for determining a single heading.** *Cir-1816, Tec-77*, July 10, **1950.** 5+leaves. 2 figs., chart, 3 refs., equations. **MH-BH**—The theory and forecasting procedure for the single heading method of pressure pattern flying over great distances are developed and illustrated by rough schematic diagrams. A "D" factor, pressure altitude graph is appended. *Subject Headings:* **Single heading flights, Pressure pattern flying, Aeronautical meteorology, Nomograms.**—*M.R.*

TURBULENCE

2.1–117 551.551

Brier, Glenn W., **The statistical theory of turbulence and the problem of diffusion in the atmosphere.** *Journal of Meteorology*, 7(4):283–290, Aug. **1950.** 6 figs., table of symbols, 9 refs., 34 equations. **MH-BH**—An extension of Taylor's and Sutton's formulas for diffusion of particles from a point source has been made to take into account the initial distance between particles. The mathematical theory is developed at length, followed by a description of an

unsuccessful experiment performed (at Wilmington, Ohio, Nov. 1947) for about an hour and to 50 miles distance and 35,000 ft. elev., to determine the dispersion due to turbulence. *Subject Headings:* **Turbulence, Eddy diffusion, Sounding balloons.**—*M.R.*

2.1–118 551.551:551.588.2

Serra, Antonio, **Note di climatologia della Sardegna. I—Turbolenza e vortici sul massiccio montuoso del Sarrabus.** [Note on climatology of Sardinia. I—Turbulence and eddies over the Sarrabus Range.] *Rivista di Meteorologia Aeronautica*, 10(1):29–32, Jan.–March **1950.** 4 figs., ref. Summaries in Italian, French, English and German p. 29. **MH-BH**—The effect of the mountain ranges in southern Sardinia on the westerly and northwesterly winds is discussed and illustrated. In certain situations peculiar cloud forms and attending turbulence are observed at the surface and aloft over these mountains. *Subject Headings:* **Turbulence, Topographic effects, Sarrabus Range, Sardinia.**—*M.R.*

WIND AND VERTICAL MOTION

2.1–119 551.554

Gordon, A. H., **Variation of wind with height at low levels over the sea.** *Meteorological Magazine, London*, 79(940):295–297, Oct. **1950.** 3 tables. **MH-BH**—From pilot balloon ascents in 40–50°N, 10–20°W mean scalar velocities and vector winds at surface, 1000, 2000, 3000 and 4000 feet are calculated. Ratios of surface wind to that at 2000 ft. are around 0.9, with diurnal variation from 0.82 15–19h. to 1.01 11–12h. *Subject Headings:* **Wind gradient, Upper air winds, Oceans.**

2.1–120 551.556.3:621.311.24

Golding, E. W., **Large-scale generation of electricity by wind-power—preliminary report.** *British Electrical and Allied Industries Research Association, Technical Report* Reference C/T 101, **1949.** 15 p. 8 figs., 16 refs. **GB-MO**—Tests conducted on hills of suitable shape in Orkneys gave mean wind speeds up to 15.1 m. p. h. in summer. Structure of wind on Costa Head investigated up to 66 ft. Other trials in progress in North Wales and Cornwall. It is concluded that several hundred sites could be found in Britain for economical wind-driven generators giving 3500–4000 kWh/kW. More information required about flow of wind over hills. *Subject Headings:* **Wind utilization, Wind generators, Applied meteorology.**

2.1–121 551.556.3

Peronaci, Francesco, **Rilevamento dell'energia del vento ai fini della sua utilizzazione mediante aeromotori.** [Determination of wind energy for the purpose of its utilization by wind machines.] *Annali di Geofisica*, 3(2):223–230, April **1950.** 7 figs. **MH-BH**—In order to install wind machines capable of generating electricity on a small scale the following wind data are required: the number of hours per year in which the wind velocity does not fall below a given strength, the frequency distribution of wind direction, and the intensity of squalls. The wind regime of several zones in Calabria is studied with reference to the possible installation of wind machines. *Subject Headings:* **Wind generators, Wind utilization, Italy.**—*I.L.D.*

2.1–122 551.557:629.13

Davies, D. M., **Atmospheric winds.** *Royal Aeronautical Society, Journal*, 54(477):602–605, Sept. **1950.** 4 figs., ref. **DLC**—A simple technical exposition of geostrophic wind theory and its application to pressure pattern flying and to variation of wind with height, respectively. Effect of sloping tropopause, the *jet stream* and thermal winds is also discussed from the point of view of aerial navigation. *Subject Headings:* **Upper air winds, Aeronautical meteorology.**—*M.R.*

2.1–123 551.557:629.13

Great Britain Meteorological Office, **Equivalent headwinds on some of the principal air routes of the world.** London, H. M. Stationery Office, **1950.** 19 p. 2 figs., 12 p. tables. (*Great Britain Meteorological Office, Meteorological Reports* 2, No. 7.) At head of title, M. O. 535b. **DWB**—An equivalent head (or tail) wind is the uniform wind along an air route

which results in the same average ground speed as that actually attained. Tables give for each season estimated headwinds at 10,000, 20,000, 30,000 and 40,000 ft., both outward and return, for 120 air routes in all parts of the world. Standard deviations are given and a table for calculating headwind likely to be exceeded on any proportion of the flights. *Subject Headings:* **Upper air winds, Aeronautical climatology.**

2.1–124 551.577:551.508.85:551.590.25

Manning, L. A., Villard, O. G., Jr., and Peterson, A. M., **Meteoric echo study of upper atmosphere winds.** *Institute of Radio Engineers, Proceedings*, 38(8):877–883, Aug. **1950.** 11 figs., 12 refs., 11 equations. **DLC**—Movements of ionized meteor trails in the 80 to 100 km. region (ionosphere) are subjected to analysis by means of a statistical study of the Döppler effect produced by the drift on radio reflections. Average winds of 125 km./hr. (subject to a possible 20% error) prevailing from the southwest and north were obtained in the summer of 1949. Equipment, methods of observation and theory discussed and illustrated. *Subject Headings:* **Upper air winds, Meteor trails, Radio echoes.**—*M.R.*

2.1–125 551.558

Voss, H., **Lassen sich Vertikalbewegungen in der Atmosphäre mit Hilfe der Windmessung durch Funkmessgeräte (elektrische Windmessung) erfassen?** [Can vertical motion in the atmosphere be determined with the help of wind measurements by radiosonde (electrical wind measurement)?] *Annalen der Meteorologie*, 3(5–6):175–178, **1950.** 4 figs. **MH-BH**—Simultaneous fluctuations of wind, pressure and temperature records are due to variations of ascensional velocity of the balloon, from which vertical currents can be calculated. Illustrated by fine structure of records in anticyclone, rain area and thunder; the latter gave an upward current exceeding 10 m./sec. *Subject Headings:* **Vertical motion, Wind measurements, Radiosondes.**—*C.E.P.B.*

2.1–126 551.558.1:551.521.3

Frankenberger, Ernst, **Konvektion durch Ausstrahlung.** [Convection due to outward radiation.] *Annalen der Meteorologie*, 3(7–8): 244–246, **1950.** fig., table. German and English summaries p. 244. **DWB**—From the autographic records of temperature and humidity at 10 and 70 m. at Quickborn on night of 5/6 Jan. 1949, the occurrence of vertical displacements on an otherwise especially calm night is deduced. The cause was the labilization of the ground layer of air by radiation from a cloud cover. The movements were local. *Subject Headings:* **Vertical motion, Radiation.**—*C.E.P.B.*

2.1–127 551.558.1

Millar, F. Graham, **Air currents revealed by soaring gulls.** *Marine Observer*, 20 (149):154–157, July **1950.** 2 figs., 3 refs. **MH-BH**—Gulls soar over open sea in updrafts between convection cells when sea is warmer than air and wind-force 4 or less. Circulation can also be observed in drift of floating objects and in steam fog. *Subject Headings:* **Vertical motion, Bird life.**

AQUEOUS VAPOR AND HYDROMETEORS

WATER VAPOR AND CLOUDS

2.1–128 551.571:536.2

Devienne, Marcel, **Influence de l'humidité sur la conduction thermique des corps granuleux.** [Humidity influence on the heat conductivity of granular bodies.] *France, Centre National de la Recherche Scientifique, Journal des Recherches*, No. 8, p. 238–245, **1949.** 2 figs., 4 tables, 9 equations. **MH-BH**—This is a theoretical and experimental investigation of the effect of humidity upon the heat conductivity of a powder. Data are presented on the effect of varying percentages of water, introduced into the powder, upon heat conductivity. The interfering influence exerted upon the heat conductivity by the coefficient of heat conductivity of water vapor, by the condensation of water vapor in cold zones and by the coefficient of heat conductivity of liquid water are analyzed. It is found that a small quantity of water, less than three grams per liter, can increase the coefficient of heat conductivity of a powder by about 50 percent. *Subject Headings:* **Humidity, Heat conductivity.**—*I.L.D.*

2.1–129 551.573:551.578.46

Champion, D. L., **Ablation in the Scottish Highlands.** *Meteorological Magazine, London,* 79(940):292–295, Oct. **1950.** 4 figs. **MH-BH**—Account of daily measurement of snow bed on Ben Macdhui July 1949. Ablation in inches per day was roughly 0.24×temperature°F. above freezing. *Subject Headings:* **Ablation, Scottish Highlands.**

2.1–130 551.551:551.576:11 551.574.1

Gabilly, A., **Sur le rôle que peuvent jouer les rafales dans la coalescence des gouttelettes d'un nuage.** [On the role that gusts play in the coalescense of cloud droplets.] *Annales de Géophysique,* 5(3):232–234, July–Sept. **1949.** 6 refs., equations. **MH-BH**—A theoretical analysis of the coalescence of cloud droplets by the action of gusts which impart varying velocities to droplets of different masses. An equation for calculating the number of droplets that coalesce, given the number of droplets per cubic centimeter, velocity of the droplets and a coefficient of coalescence is derived. Several numerical applications are presented. The efficiency of gusts rises very rapidly as the diameter of the droplets increases. *Subject Headings:* **Turbulence, Cloud physics.**—*I. L. D.*

2.1–131 551.574.1:551.578.11

Jakl, V. E., **Remarks on "Condensation nuclei and precipitation."** *Journal of Meteorology,* 7(4):304–305, Aug. **1950.** 5 refs. Byers, Horace R., Reply, p. 305. ref. **MH-BH**—A criticism of Byers' (1949) explanation of the formation of large raindrops in the absence of the ice stage. The calculations indicate that even if there is such a radical change in possible absolute humidity (when air is lifted from a level where temperature is 290°K. to one where it is 260°K.) that an uninterrupted rise of 5 Km. would extract nearly ¾ of the original content, it would be rare that the resultant effects of size, number and duration of original droplets in saturated air would produce drops of a size to fall. In rebuttal, Byers admits that it would be unusual for conditions to exist which would permit such formation of drops; but that is just the point—occurrence of showers without the ice phase. *Subject Headings:* **Condensation nuclei, Raindrop formation.**—*M. R.*

2.1–132 551.575.1

Artamonov, A. A., **Tumany. Ikh obrazovanie i klassifikatsiia.** [Fog. Its formation and classification.] *Moscow. University. Vestnik, Ser. Fiziko-Matematicheskikh i Estestvennykh Nauk,* 4(9):173–180, **1949.** 2 figs., table, 8 refs. **DLC**—Fog is defined and its formation and classification discussed. The system of Willett's (1929) was adopted by Europeans (Khromov translated Willett's paper into Russian in 1931) but it was thought that the system was not completely satisfactory for regions under the influence of the vast continent of Asia. The present work goes into the subject of genetic classification of fog critically and subdivides **advective fogs** into (a) fogs formed by *cooling* (1) of warm air masses, (2) along sea coasts and (3) at sea, and (b) fog formed by *evaporation* (1) in cold air masses and (2) of precipitation. **Radiation fogs** are divided into (a) *cooling fog:* (1) ground fog, (2) urban fog (smog) and (3) frost fog (mainly in Siberia), and (b) evaporation fog (1) polar and (2) lake fog. *Subject Headings:* **Fog formation, Fog classification.**—*M. R.*

2.1–133 551.576

Brooks, C. E. P., **Cloud phenomenon near Ferring, Sussex, May 14, 1950.** *Meteorological Magazine, London,* 79(939):266, Sept. **1950.** sketch. **DWB**—Small spiral cloud in otherwise clear dry air. *Subject Headings:* **Clouds, England.**

2.1–134 551.576.1:551.577.5

§Rodewald, Martin, **Wolkenstrassen über Holstein.** [Cloud lanes over Holstein.] *Annalen der Meteorologie,* 3(7–8):202–213, **1950.** 11 figs., 4 tables, 3 refs. German and English summaries p. 202. Bintig, Paul, **Ein auffälliger Starkniederschlag.** [A remarkable heavy rain.] *Ibid.,* p. 213–214. fig. **DWB**—Two cloud strips which had considerable effect on weather are described, and attributed to convergence of sea breezes over a warmed peninsula, the upper wind blowing parallel to the coast. One on 21.6.49 extended from the Harz to Jutland and gave over 5 mm. rain in an otherwise nearly rainless area; 500 mb. wind almost

due north, with convergence at surface along a cold front. The second, 23.7.49, developed along a trough with very light upper winds and gave two areas of rain, exceeding 20 mm. NW of Hamburg, with thunder and squalls. Both cases are analyzed in detail. *Subject Headings:* **Cloud lanes, Precipitation, Germany.**—*C.E.P.B.*

2.1–135 551.576.11

Dessens, H. and Fournier d'Albe, E. M., **Première campagne d'étude des orages Pyrénéens.** [First study of thunderstorms in the Pyrenees.] *Annales de Géophysique*, 6(2):130–132, April–June **1950.** 3 figs. French and English summaries p. 130. **MH-BH**—The authors present the results of a photogrammetric study of the origin and development of the isolated cumulonimbus clouds which form frequently over the Pyrenees during fine weather. *Subject Headings:* **Clouds, Thunderstorms, Pyrenees.**—*I.L.D.*

2.1–136 551.576.12

Douglas, C. K. M., **Altocumulus castellatus clouds.** *Meteorological Magazine, London*, 79(939):266–267, Sept. **1950. DWB**—Discussion of letter by R. H. Eldridge, *ibid.*, 79(936):177, June 1950, on nomenclature of cumulus castellatus and cumulus congestus. *Subject Headings:* **Altocumulus clouds, Cloud classification.**

2.1–137 551.576.2

Jolivet, J., **La couverture nuageuse de la montagne Pelée.** [Cloud cover of Mount Pelée.] *Annales de Géophysique*, 5(3):211–212, July–Sept. **1949.** 3 figs. **MH-BH**—The temperature at the top of the volcano influences directly the cloud cover that surrounds it; the cloud cover is generally greatest at lower temperatures. *Subject Headings:* **Cloudiness, Mount Pelée, Martinique.**—*I.L.D.*

RAINFALL

2.1–138 551.577

Rizika, Jack W., **A philomathic study of rain.** *American Scientist*, 38(2):247–252, April **1950.** 5 figs., table, equations. **DLC**—A logical, theoretical study giving tables of the optimum rates for a person walking in rain, assuming a constant rate of fall, etc., but with varying wind direction and speed in relation to the path of the moving parallelepiped (pedestrian to you). The wetness acquired during travel is also indicated. *Subject Headings:* **Precipitation effects, Human activity.**—*M.R.*

2.1–139 551.506.3 551.577.2 551.582(471)

*Angervo, J. M., **Helsingin sadeolot 1845–1944.** [Precipitation over Helsinki 1845–1944.] *Helsinki. University. Institute of Meteorology Papers*, No. 61, **1948.** 58 p. 2 figs., 16 tables, 44 refs. English summary p. 35. (Reprint from *Fennia*, 70, No. 6.) **MH-BH**—The characteristics of the precipitation at Helsinki for 1845–1944 and for shorter periods are described and analyzed. Tables give data on mean monthly rainfall and its heaviness for 1845–1944 and shorter periods, mean monthly and seasonal number of rain days for various intervals, climatic change of the number of rain days for thirty and forty years, mean monthly maxima and minima of rainfall, etc. Similarly, tables on mean monthly snowfall, mean monthly maximum and minimum snowfall, average monthly number of snow days for various intervals, largest amount of daily snowfall, etc., are given. The climatic changes as regards rainfall indicate that amount of rainfall increased up to end of nineteenth century but has been decreasing since beginning of the twentieth. The relationship between topography and rainfall is considered. *Subject Headings:* **Precipitation variations, Long period observations, Climatic changes, Finland.**—*I.L.D.*

2.1–140 551.577.2(469)

Ferreira, H. Amorim, **Distribuição da chuva no território do continente Português.** [Distribution of precipitation on the Portuguese mainland.] Observatório do Infante D. Luiz, Lisbon, **1943.** 14 p. **MH-BH**—A description of variations in precipitation means and extremes in various parts of Portugal and their probable causes, based on data for 1901–1930 at 14 stations. *Subject Headings:* **Precipitation distribution, Portugal.**—*M.R.*

2.1–141 551.577.3:551.590.21(45)

†Cianferoni, Reginaldo, **Sul regime pluviometrico di Firenze (1832–1949).** [The rainfall regime of Florence (1832–1949).] *Annali di Geofisica*, 3(3):393–406, July **1950.** 4 figs., 8 tables, 5 refs. **MH-BH**—The rainfall regime at Florence is analyzed on the basis of data extending from 1832 to 1949. The author discusses mean annual rainfall for 118 years and the maximum deviations from the mean, monthly and seasonal distribution of amount of rainfall, mean monthly frequency of rainfall and mean intensity of each rainy day of every month. The possibility of a correlation between rainfall and solar activity is considered. The data are presented in tabular and graphical form. *Subject Headings:* **Precipitation variations, Solar influences, Florence, Italy.**—*I.L.D.*

2.1–142 551.577.38

Glasspoole, J. and Rowsell, H., **Absolute droughts of August 1947.** *Meteorological Magazine, London*, 79(939):260–262, Sept. **1950.** fig., 2 photos, ref. **MH-BH**—A record drought occurred in Britain July 29–Sept. 16, 1947. Chart shows greatest number of consecutive days without rain exceeding 40 locally and reaching 50 in Kent. Photos show effect on storage dams. *Subject Headings:* **Drought, Great Britain.**

2.1–143 551.577.52(436)(481)

*Godske, C. L. and Paulsen, H. Schieldrup, **Investigations carried through at the Station of Forest Meteorology at Os. II. The forest precipitation.** *Bergen. University. Årbok 1949, Naturvitenskapelig rekke*, No. 8 [1950]. 36+p. 9 figs., 16+tables, 11 refs., 9 equations. **MH-BH**—No systematic studies of the effect of forests on rain and snowfall and measurement thereof since Hoppe conducted such experiments in spruce and pine forests in Austria in 1894 and 1895. The present study made in 1944–1946 in a spruce forest near Os, analyzes comparative data for 9 gages, according to distance from trees, direction of wind, etc. Compared with the Austrian data, there are marked differences arising from different types of forest in Norway and Austria. *Subject Headings:* **Precipitation, Forest influences, Mariabrunn, Austria, Os, Norway.**—*M.R.*

HYDROMETEOROLOGY

2.1–144 551.577:551.515.8:551.579

Benton, George S. and Blackburn, Robert T., **A comparison of precipitation from maritime and continental air.** *American Meteorological Society, Bulletin*, 31(7):254–256, Sept. **1950.** table, 2 refs. **MH-BH**—A study of the sources of precipitation at Huntington, West Virginia, confirms the hypothesis that maritime air masses are the source of precipitation for eastern United States. Of 39.83 inches of rain that fell during 123 precipitation periods in 1946, 85 to 90% of the precipitation could be traced to maritime air masses and 10 to 15% to continental air masses. The probable results of the extension of this study to other areas are considered. *Subject Headings:* **Precipitation sources, Air masses, Hydrologic cycle, Huntington, West Virginia.**—*I.L.D.*

2.1–145 551.579 551.5:62

McClendon, Elmo W., **The role of meteorology in projects of the Corps of Engineers in the Missouri River Basin.** *American Meteorological Society, Bulletin*, 31(7):238–243, Sept. **1950.** 4 figs. **MH-BH**—The hydrologic and meteorologic characteristics of the Missouri River Basin are described and the plan for the development of the water resources of the Missouri River Basin is summarized. The application of meteorological data to the development of flood design is discussed in detail and a specific example of the use of meteorological data in concrete pouring operations is given. *Subject Headings:* **Hydrometeorology, Engineering, Applied meteorology, Missouri River Basin.**—*I.L.D.*

2.1–146 551.579.1

Thomson, Reginald W. S., **The application of statistical methods in the determination of the yield of a catchment from runoff data. With a statistical note by D. Halton Thomson.** *Institute of Water Engineers, Journal*, 4(5):394–428, Aug. **1950.** 8 figs., 14 tables. David Lloyd, **Note.** *Ibid.*, p. 429–432. 2 figs. **MH-BH**—The general formula for runoff Y is simpli-

fied to $Y = Me \exp(vt)$ where Me is median runoff, v is coefficient of variation and t is the deviation from the mean when the distribution is transformed to a normal one. From Hazen's probability diagram and this expression, standard curves are constructed and used to determine the minimum anticipated yield from a catchment area. *Subject Headings:* **Runoff, Catchment basins.**

2.1–147 551.579.4

Church, Phil E. and Schallert, William L., **Meteorological aspects of the Columbia River Basin flood of 1948.** *Northwest Science*, 23(2):82–86, May **1949.** (Reprint available: Washington, University, Dept. of Meteorology and Climatology, Contribution No. 1.) **MH-BH**—The flood of May and June 1948 in the lower Columbia Basin was the most disastrous in the history of this area. (Greatest discharge at the Dalles since 1894.) Winter and spring weather of 1948 in Pacific Northwest discussed. Upper air circulation, snow, soil moisture, precipitation and temperature for last two weeks in May immediately before flood conditions began, are described. Conclusion that delayed snow melting, saturated soil and warm moist winds at end of May combined to produce high discharge rate in tributaries. *Subject Headings:* **Floods, Columbia River Basin.**—*M.R.*

2.1–148 551.579.5

Uhlig, Siegfried, **Die Untersuchungen des Bodenwasserhaushalts durch den Deutschen Wetterdienst in der US-Zone.** [The investigation of ground water economy by the German Weather Service in the US-Zone.] *Meteorologische Rundschau*, 3(7–8):158–162, July–Aug. **1950.** 6 figs. **DWB**—Columns of soil 1 meter long were bored out and water content every 10 cm. expressed as percent by weight of dry soil. Results shown for Nov. 1949–Feb. 1950 at Heidelberg and Jan.–Dec. 1949 at various stations with different subsoils. Percolation was measured by lysimeter at Giessen. A chart of horizontal distribution of ground water at 10–20 cm. over an area 40 cm. square shows appreciable variation. Evaporation and transpiration are briefly discussed and practical value of measurements of soil moisture for agriculture illustrated. *Subject Headings:* **Hydrologic cycle, Percolation.**—*C.E.P.B.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

2.1–149 551.58(02)

†*Brooks, C. E. P., **Climate in everyday life.** London, Ernest Benn, **1950.** 314 p. 34 figs., 26 tables, 3 append., (tables, 155 refs.) **DWB**—A book planned to provide the practical information most often required about climate. Pt. I, **Living with the climate,** discusses the various types of climate and their effect on human efficiency, comfort and health. World charts are given for mean air and wet-bulb temperatures, Jan. and July. Subjects discussed include water-, wind- and sun-power, water supply, and transport, including hindrance by snow cover and sea ice. Chap. 2 discusses siting and design of houses and factories in relation to climate (with table of sunshine at 107 places), lighting, purity of air, local climates, and wind structure. In Chaps. 3–7 the peculiarities of different climates are set out from the human point of view. Pt. II, **Climate as an enemy,** discusses climate and the deterioration of materials, including extreme temperatures in the sun and effect of temperature and humidity on corrosion and moulding; atmospheric pollution; and climatic "accidents"—heavy rain, floods, hail, snow, ice storms, lightning, tornadoes, squalls, hurricanes and typhoons. Pt. III, **Control of climate,** includes heating, air conditioning, lighting, clothing, rain-making and fog dispersal, prevention of hail, protection from lightning, frost prevention and wind-breaks. Appendix I gives climatic statistics and "thumb-nail" sketches for over 270 places in all parts of the world. *Subject Headings:* **Climatology, Architecture, Industrial climatology.**

2.1–150 551.58(02)

Conrad, Victor and Pollak, Leo Wenzel, **Methods in climatology. Including some methods in general geophysics.** 2nd ed., rev. and enl. Cambridge, Harvard University Press, **1950.** 459 p. 115 figs., 99+tables, refs., numerous equations, 7 append. **MH-BH, DLC**—The aim

of this work, as was the case with the first edition (1944), is to help the student or research worker in climatology or geophysics to solve *types* or *groups* of problems rather than *individual* problems. Most of the chapters in Pt. I. (Methods in climatology) have been revised and enlarged. They cover such problems as: (1) peculiarities in observational material and methods, (2) statistical analysis of climatic elements, (3) aids to computation such as nomograms and tables, (4) curve fitting and smoothing, (5) harmonic analysis, (6) application of methods to temperature and pressure data, (7) to wind, humidity, cloudiness and precipitation data, (8) homogeneity and correlation, reduction to a standard period, (9) isoline charts, anomalies, profiles, wind roses and indices and (10) climatography, including dynamic climatology. Pt. II is entirely new material including a chapter on mechanical methods of computation (slide rules, calculating machines, punched card machines and their application) and three on periodography: (1) hidden periodicities, (2) tests of significance and (3) autocorrelation. A useful set of tables giving in detail the values of various functions is contained in the appendix. The text is amply illustrated and annotated, and contains material of value to both the elementary and the most advanced student. *Subject Headings:* **Climatology, Statistical methods, Textbooks.**—*M.R.*

2.1–151 551.582(43)

†*Hauer, H., **Klima und Wetter der Zugspitze; 50 Jahre meteorologische Beobachtungen des Observatoriums Zugspitze.** [Climate and weather on the Zugspitze; 50 years meteorological observations of the Zugspitze Observatory.] *Deutscher Wetterdienst in der US-Zone, Berichte,* No. 16, **1950.** 200 p. 67 figs., 16 photos, 165 tables, 128 refs. **MH-BH**—A most comprehensive presentation of weather data of every type, both in the form of detailed tables and in analytical form (discussion, graphs and illustrative tables). Besides excellent photographs of the exterior, interior and surroundings of this mountain station, there is an exhaustive bibliography (by Dr. H. Zierl), a description of the station, names of all observers during the 50-year period, a location chart, and several special articles by well-known German scientists. *Subject Headings:* **Climatology, Mountain meteorology, Zugspitze, Bavaria.**—*M.R.*

2.1–152 551.582(57)

Liverovskiĭ, IUriĭ Alekseevich and Kolesnikov, B. P., **Klimat.** [Climate.] (In **Priroda iuzhnoĭ poloviny Sovetskogo Dal'nego Vostoka.** [The nature of the southern half of the Soviet Far East.] Moscow. Akademiia Nauk, SSSR, Institut Geografii, **1949.** p. 84–105. photo, 4 charts, maps, table.) **DLC**—A rational discussion of the climate of Eastern Siberia based on solar radiation data for 4 stations, pressure and circulation charts (Khromov), synoptic charts, evaporation data, etc. Climate also discussed by seasons and sub-regions. *Subject Headings:* **Climatology, Eastern Siberia, U.S.S.R.**—*M.R.*

2.1–153 551.582(44)

*Piéry, M., Dufay, J., Enselme, J., et al., **Le climat de Lyon et de la région Lyonnaise.** [The climate of Lyon and the Lyonnaise region.] Lyon, Éditions Cartier [**1946**]. 389 p. numerous figs., tables and refs. **MH-BH**—An elaborate, beautifully illustrated and comprehensive treatise on many aspects of the local and regional climate of the Lyon area based on instrumental records from 1880–1945 and on many historical records. The work is really a collection of separate treatises by 10 authorities under the editorship of Doctor Piéry. The contributors are all meteorologists, astronomers, hydrologists, aerologists or medical professors. The work is divided into four books: I. The meteorological and cosmic and geophysical factors in the climate of Lyon, II. Bioclimatology and physioclimatology of the urban and rural areas of Lyon, III. Human climatology, IV. Climatopathology and climatotherapy of Lyon. In the 21 chapters of the 4 books the usual meteorological factors are discussed from the point of view of the macro-, meso- and micro-climate. In addition, many unusual aspects are considered: atmospheric electricity, transparency of the air, air masses, local rainfall and temperature differences, solar and magnetic activity, meteorological catastrophies, geological factors, historical and prehistoric (paleo) climates and events of meteorologieal interest, atmospheric pollution, aerobiology, odors, effect on psychology and physiology, climate and arts or architecture, letters, science, etc. *Subject Headings:* **Climatology, Bioclimatology, Historical climates, Lyon, France.**—*M.R.*

2.1–154 551.582(45)

*Polli, Silvio, **Valori medi ed estremi del clima di Trieste.** [Mean and extreme values of the climate of Trieste.] *Instituto Talassografico, Pubblicazioni, Trieste,* No. 257, **1950.** 15 p. 3 tables, refs. **MH-BH**—Mean and extreme monthly and annual values of pressure, temperature, precipitation (including snow and hail), humidity, evaporation, cloudiness, insolation, wind and soil and sea temperature for entire period of record (1841–1940 in many cases) for Trieste given in tables and discussed in brief text. *Subject Headings:* **Climatology, Trieste, Italy.**—*M.R.*

2.1–155 551.582(47)

Rybin, N. G., **Klimat.** [Climate.] (In **Fiziko-geograficheskiĭ ocherk Kirovskogo Rraia.** [Physical-geographical outline of the Kirov area.] Kirov, Kraevoe Gosudarstvennoe Izdatel'stvo, **1936.** p. 68–78. 4 figs., 10 tables p. 140–155.) **DLC**—Discussion of temperature, frost, cloud, precipitation, snow cover, etc. in the Kirov region, with application to agricultural possibilities of the area. Following the chapter on climate is a related chapter on hydrology and one on the soils of this region (northwest of Gorki). Illustrative diagrams are included. *Subject Headings:* **Climatology, Kirov Area, U.S.S.R.**—*M.R.*

2.1–156 551.582(98)

Vize, Vladimir IUl'evich, Gorbatskiĭ, G. V., Gorbunov, G. P., et al., **Klimat.** [Climate.] (In **Sovetskaia Arktika moria i ostrova.** [Soviet Arctic, seas and islands.] Leningrad, Izdatel'stvo Glavsevmorputi, **1946.** p. 32–52. fig., 3 photos, 2 charts, 11 tables, refs. p. 143–149.) **DLC**—A discussion of the general climatic features of the Soviet Arctic Regions, based on the latest observational data, with respect to solar radiation, temperature, wind, pressure, gales, blizzards, precipitation, cooling power, icing of surface objects, fog, etc. In addition, there is a discussion of the characteristics of the various seasons in the Soviet Arctic. Sample analytical tables show comparative conditions at Arctic land stations. *Subject Headings:* **Climatology, Arctic, U.S.S.R.**—*M.R.*

2.1–157 551.582.1(689)

Peake, J. S., **Meteorology in Southern Rhodesia.** *Weather,* 5(10):343–345, Oct. **1950.** 2 figs. **DWB**—General account of climate (map of mean annual rainfall) and effects of recent drought on the life of the country. *Subject Headings:* **Climatology, Drought, Southern Rhodesia.**

MICROCLIMATOLOGY

2.1–158 551.584

†Geiger, Rudolf, **The climate near the ground.** 2nd ed., rev. and enl. Cambridge, Harvard University Press, **1950.** Price $5.00. 482 p. 181 figs., 63 tables, 821+refs. "A translation by Milroy N. Stewart and others of . . . **Das Klima der bodennahen Luftschicht."** **MH-BH**—The first edition (in German) of Geiger's monumental work appeared in 1927 and was translated into English by Prof. Leighly in 1942 (several chapters had been translated in 1936 by C. P. de Blumenthal of the U. S. Forest Service). The second edition (1941) was greatly enlarged and completely re-written by Prof. Geiger, but by the time the present translation was completed a third edition was in the hands of the printer in Germany. So enough supplementary material was furnished by the author to make this English edition comparable with the third German edition. A translation from the German is often more difficult to read and understand than the original. In this case the reverse is true (for anyone whose native tongue is English).

The author defines *microclimatology* as the study of the climate of the layer of air within 2 meters of the ground. It is amazing how varied are the fields of theoretical and applied meteorology that come under the scope of *microclimatology* and are treated in detail and with great clarity in this work. The first section of part one (which covers the theoretical aspects of microclimate) deals with energy exchange and eddy transport of heat near the ground in daytime and at night. Conduction (from the soil), convection and radiation are considered in separate chapters. Section two takes up temperature conditions in the surface layer in all

its aspects. In section three humidity, wind, optical, acoustical and chemical properties of the ground layer are treated. Section four goes into the influence of the ground itself and other factors on the microclimate; ground temperature, soil cover, water, snow or ice, sod, including a supplementary chapter on quantitative measurements of heat exchange between the surface and atmosphere.

Part two covers the applied phases of microclimatology (microclimate in its relations to topography, plants, animals and man). Section five is concerned with topographical influences (cold air pools and dams; slope and valley effects in regard to air drainage and radiation; instrumental exposures effected by topography; caves and wind tunnels). Section six deals with the influence of vegetation on heat economy, radiation, temperature, humidity, wind, etc.; forest climatology and influence on meteorological elements (including precipitation and soil moisture). Section seven deals with the relation of animals and man to microclimate; ants, grasshoppers, rabbits, bats, bees, forest parasites, etc.; the conscious and unconscious influence of man on climate (through cultivation, irrigation, de-forestation, industrialization and city building); the artificial climates of health resorts, greenhouses, hospitals, shelter belts, beds, stables, clothing, air conditioned houses; and finally, the field of frost and frost protection or control by caps, screens, flooding and smudging.

The carefully prepared subject bibliography (arranged by chapters in the text) provides the student with a guide to sources which will amplify the already rich source which this work comprises. Scores of tables, charts and schematic diagrams (many of them original), and a few basic equations characterize this work as empirical and exploratory rather than theoretical or inductive. *Subject Headings:* **Microclimatology, Applied climatology, Textbooks.**—*M.R.*

2.1–159 551.584:551.586

Kreutz, Wilhelm, **Merkblatt zur Mietenbehandlung. Verminderung von Mietenschäden durch Steuerung des Mietenklimas.** [Pamphlet on crop storage. Reduction of crop damage by means of control of storage climate.] *Deutscher Wetterdienst in der US-Zone, Mitteilungen*, No. 7, June **1950.** 8 p. 5 figs. **MH-BH**—In storing crops, such as potatoes, in ricks over the winter, consideration must be given to the role of climate in rapid cooling and drying of the stored crop during fall, in protection against winter cold and against premature warming up in fall. The author describes methods of setting up and ventilating ricks in order to attain favorable microclimatic conditions. The winter march of temperature within a ventilated and non-ventilated rick during a mild winter is illustrated and comparison is made with the march of temperature during a very cold winter. *Subject Headings:* **Crop storage, Microclimatology, Agricultural meteorology.**—*I.L.D.*

2.1–160 551.584.42

Broadbent, L., **The microclimate of the potato crop.** *Royal Meteorological Society, Quarterly Journal*, 76(330):439–454, Oct. **1950.** 8 figs., 6 tables, 6 refs. **MH-BH**—At Rothamsted in summer 1947–49 temperatures and humidities were recorded in a standard screen and at 15 cm. in potato crops. In sunny periods max. temperature was 0–13°F. higher and min. 2°F. lower in crop than screen. Humidity in crop was higher by day and lower by night. In 1948–49 records of temperature, humidity and wind were taken at different heights in and above crops, both dry and irrigated. The vertical gradients, diurnal variation and rapid fluctuations due to wind are shown in a number of diagrams. Temperature and dew point were highest at 10 cm. in open crop, 30 cm. in dense crop. The investigation was in connection with spread of disease. *Subject Headings:* **Microclimatology, Agronomy.**

2.1–161 551.584.42

Waterhouse, Fred L., **Humidity and temperature in grass microclimates with reference to insolation.** *Nature, London*, 166(4214):232–233, Aug. 5, **1950.** fig. **DWB**—In long grass at Dundee on July afternoons three zones were noted: 0–10 cm., 17–18°C., R.H. 90–100%; 10–25 cm., 25–26°C., 47–55% (hot zone); 25–50 cm., 24–25°C., 46–47%. During sunshine insect temperatures are higher than air in summer but not in autumn. At night lowest zone is 2–3°C. warmer than higher zones. *Subject Headings:* **Microclimatology, Grass temperatures.**

BIOCLIMATOLOGY

2.1–162 551.586:551.524.36:697

Parkerson, William, **Seasonal performance factor of the heat pump.** *Heating and Ventilating*, 46(1):61–64, Jan. **1949.** 3 figs., table. **DWB**—Temperature frequency data for Chicago for 1935–1939 used to determine average running time for heat pump at various temperatures. Bimodal distribution shown, with distinct maximum at 34°F. and secondary at 69°F. Such data available for 117 cities in the United States makes it possible to specify the "basic" temperature for air-to-air heat pumps for each city. The coefficient of performance for each type of pump combined with "basic" temperature would give the seasonal performance factor for each city and each type of heat pump. *Subject Headings:* **Applied climatology, Heat pumps.**—*M.R.*

2.1–163 551.586:06

Knoch, Karl, **Die Bioklimatologie auf dem 2. Deutschen Bädertag in Bad Kissingen.** [Bioclimatology at the 2nd German Balneology Conference at Bad Kissingen.] *Meteorologische Rundschau*, 2(9–10):295–300, Sept.–Oct. **1949. DWB**—*Subject Headings:* **Bioclimatology, Bad Kissingen Balneology Conference.**

2.1–164 551.586:58

Richards, P. W., **Climatic limits of vegetation.** *Nature, London*, 166(4222):536–538, Sept. 30, **1950. DWB**—Report of discussion at the British Association. The general theme was that there is no simple correlation between distribution of vegetation and climate; different factors (rain, frost, snow, wind) affecting different floras. *Subject Headings:* **Bioclimatology, Plant ecology.**

2.1–165 551.586:59

Locusts and grasshoppers. *Nature, London*, 166 (4224):625–626, Oct. 14, **1950. DWB**—Report of discussion at the British Association. Migration of locusts attributed to climatic factors, especially solar radiation. Direction and height of flight affected by convection currents and winds. *Subject Headings:* **Bioclimatology, Insect migration.**

2.1–166 551.586:63

Hamner, Karl C., **Influence of environmental factors on the vitamin content of food plants.** (In **Survey of biological progress,** George S. Avery, Jr., (ed.) New York, Academic Press, **1949.** Vol. 1, p. 313–324. 11 refs.) **DLC**—The author reviews the available information dealing with the effect of climatic factors upon the vitamin content of food plants. Light is the most important factor influencing the ascorbic acid content; a correlation between ascorbic acid and rainfall could be associated with the correlation between rainfall and light. Studies on the effect of temperature, relative humidity and air movement upon ascorbic acid content have not been detailed enough to warrant any definite conclusions. There are indications that light and rainfall affect carotene content and that variations in thiamine content are associated with season. Vitamin C in potatoes increases with decreases in storage temperature. *Subject Heading:* **Bioclimatology.**—*I.L.D.*

2.1–167 551.586:63(481)

†*Nuttonson, Michael Y., **Ecological crop geography of Norway and its agro-climatic analogues in North America.** Washington, D. C., American Institute of Crop Ecology, **1950.** 31 p. map, fold. chart, 5 tables, 28 refs. (*International Agro-climatological Ser.*, No. 12.) **MH-BH**—The geography, climate, forests, soils and agricultural crops are discussed. Data on mean monthly temperature, relative humidity and precipitation, on average killing frost dates, on duration of average frostless periods and on precipitation effectivity indices are presented for 75 meteorological stations. A list of climatically analogous North American meteorological stations with their locations is given. *Subject Headings:* **Ecoclimatology, Agricultural climatology, Norway.**—*I.L.D.*

2.1–168 551.586:63(485)

†*Nuttonson, Michael Y., **Agricultural climatology of Sweden and its agro-climatic analogues in North America.** Washington, D. C., American Institute of Crop Ecology, **1950.** 27 p. map, fold. charts, 3 tables, 30 refs. (*International Agro-climatological Ser.*, No. 11.) **MH-BH**—The general geography and climate of Sweden are described. Data on mean monthly temperature, relative humidity and precipitation, on absolute temperature, on average killing frost dates, duration of frostless periods and on precipitation effectivity indices are presented for 125 meteorological stations. A list of climatically analogous North American meteorological stations with their locations is presented. *Subject Headings:* **Ecoclimatology, Agricultural climatology, Sweden.**—*I.L.D.*

2.1–169 551.586:63(471)

†*Nuttonson, Michael Y., **Ecological crop geography of Finland and its agro-climatic analogues in North America.** Washington, D. C., American Institute of Crop Ecology, **1950.** 35 p. map., fold. chart, 4 tables, 36 refs. (*International Agro-climatological Ser.*, No. 10.) **MH-BH**—The geography, climate, forests, soils and farm crops of Finland are discussed. Data on mean monthly temperature, relative humidity and precipitation, on absolute temperature, on average killing frost dates, duration of average frostless periods and on precipitation effectivity indices are presented for 129 meteorological stations. A list of climatically analogous North American meteorological stations with their locations is given. *Subject Headings:* **Ecoclimatology, Agricultural climatology, Finland.**—*I.L.D.*

2.1–170 551.586:63

†*Nuttonson, Michael Y., **Agricultural climatology of Siberia, natural belts, and agro-climatic analogues in North America.** Washington, D. C., American Institute of Crop Ecology, **1950.** 64 p. 8 tables, 2 maps, 3 charts, 57 refs. (*International Agro-climatological Ser.* No. 13.) **MH-BH**—Siberia, in this study, includes the Soviet Far East and embraces the entire north Asian territory between the Ural Mountains and the Pacific Ocean and between the Arctic Ocean and the Manchurian-Mongolian frontier. The general and regional geography and climate are described. Agro-climatological regions are set up and are compared with climatic analogues in North America. For 374 stations data are given on mean monthly and annual temperatures, maximum and minimum temperatures, average monthly, annual precipitation and relative humidity, precipitation effectivity indexes (Thornthwaite method), average dates of killing frosts and length of frostless periods. The meteorological stations are plotted on a map together with their year-round and spring crop thermally analogous areas in North America. *Subject Headings:* **Agricultural climatology, Siberia, Soviet Far East.**—*I.L.D.*

2.1–171 551.586:63

Schwarz, Solomon M., **USSR: The shelterbelt program in its relation to other drought control projects.** *Land Economics*, 25(4):360–362, Nov. **1949. DWB**—*Subject Headings:* **Agricultural climatology, U.S.S.R.**

2.1–172 551.586:63 551.506.8

†*Seemann, J., **Die klimatisch-phänologischen Verhältnisse für Zwischenfruchtbau nach Winterroggen in Nordwestdeutschland.** [The climatic-phenological conditions for additional crops following the winter rye harvest in Northwest Germany.] Germany, Meteorologisches Amt für Nordwestdeutschland, Zentralamt für die Britische Zone, Hamburg, **1949.** 11 p. 4 tables, 3 fold. maps, 14 refs. **MH-BH**—Three large colored isoline charts of Northwest Germany show the average beginning and duration of the season favorable for supplementary crops after the winter rye harvest, respectively, and the average rainfall and frequency of various amounts for the same period (August through October). Insolation and other data presented in tables and discussed in brief text. *Subject Headings:* **Agricultural meteorology, Phenology, Northwest Germany.**—*M.R.*

2.1–173 551.586:599.9

†Pfleiderer, H. and Büttner, K., **Bioklimatologie.** [Bioclimatology.] (In **Lehrbuch der Bäder- und Klimaheilkunde,** Heinrich Wilhelm Vogt, ed. Berlin, Springer, **1940.** p. 609–949. numerous figs., tables, refs. and equations.) **DLC**—This is a comprehensive discussion of the influence of climate upon man as a biological organism. It presents the state of knowledge on this subject as it existed in 1939. The concepts of bioclimate and resort, healing, stimulating, relaxing climates, etc., are defined and the processes of weather formation are surveyed. The following topics are considered extensively: the types and properties of therapeutic climates; the properties of temperature, wind, pressure, humidity, precipitation, clouds and radiation and their effects upon the human organism; heat regulation of man; biological effects of atmospheric gases, ions, aerosols, aerosol climate and of electromagnetic phenomena; various influences and pathological conditions produced by weather; effect of weather and climate upon constitutional types; the action of weather and climatic changes upon growth, metabolism, respiration, circulation, work performance, composition of the blood, acid-base equilibrium, etc. Extensive bibliographies are given. *Subject Headings:* **Bioclimatology, Human activity.**—*I.L.D.*

2.1–174 551.586:615.8

Bürger-Prinz, H., **Die Umwelt und die Psychiatrie.** [Environment and psychiatry.] *Annalen der Meteorologie, Medizin-meteorologische Hefte,* 1(1):41, **1949. MH-BH**—*Subject Heading:* **Climatotherapy.**

2.1–175 551.586.631 551.584.42

Went, F. W., **The response of plants to climate.** *Science,* 112(2913):489–494, Oct. 27, **1950.** 4 figs. **DLC**—The author discusses the interrelationship between climate and plant growth and development, and illustrates the manner in which this problem is studied in the Earhart Plant Research Laboratory at the California Institute of Technology. Stem growth and fruit-set of tomatoes are shown to be determined by complex relationships of night temperature, day temperature and light. Response of plant to climate varies with age and maturity. The concept of heat summation is criticized as based upon false assumption of direct proportionality between growth and development and temperature; development of tomato is determined by diurnal distribution of heat. The role of temperature in the geographic distribution of plants is discussed. The climatically controlled greenhouses of the laboratory are described. *Subject Headings:* **Bioclimatology, Plant growth, Microclimatology.** —*I.L.D.*

2.1–176 551.586:635

Ulrich, M. R., **Observations sur la conservation des poires Williams par le froid, dans l'air et en atmosphères artificielles.** [Observations on the preservation of William pears by cold in air and artificial atmospheres.] *France. Centre National de la Recherche Scientifique, Journal des Recherches,* 2(4–5):46–60, **1948.** 13 figs., table, 27 refs. **MH-BH**—In this article the following topics are considered: determination of the optimum dates for harvesting Bartlett pears, the behavior of pears harvested on varying dates and stored at 0°C., the value of prematurity tests, such as soluble sugars, pH of pressed juice, solidity of attachment of fruit to stem, etc., optimum conditions for storage as determined by storage at 0°C. in air and at 0°C. in artificial atmospheres consisting of varying mixtures of O_2, CO_2 and N_2, and the effect of freezing at −5°C. and storage at 0°C. upon preservation and final maturation. *Subject Headings:* **Applied climatology, Crop storage, Horticulture.**—*I.L.D.*

2.1–177 551.586:637

Burgess, C. R., **Weather and milk.** *Weather,* 5(8):267–269, Aug. **1950. MH-BH**—Describes an old test (1913) which simulated electrical conditions in thunderstorms, showing that they were not responsible for souring of mild. Souring is due to rapid multiplication of bacteria at 65–100°F.; above 120°F. bacteria are killed. *Subject Headings:* **Bioclimatology, Dairying.**

MISCELLANEOUS APPLICATIONS

OPTICAL PHENOMENA

2.1–178 551.593.1

†Brocks, Karl, **Die Lichtstrahlkrümmung in Bodennähe.** [The curvature of light rays near the earth's surface.] *Deutsche Hydrographische Zeitschrift*, 3(3–4):241–248, **1950.** 2 figs., fold. table, 12 refs., 2 equations. German and English summaries p. 241. **DWB**—Temperature differences surface-air, due on land mostly to radiation and at sea in mid-latitudes to advection, cause marked variations of the refractive index of air with height, which over level surfaces causes mirages. If the surface is warmer than the air, height differences found by levelling are systematically too small. The main feature of the paper is a series of tables showing for every even hour of the day in each month, and in December and June separately for clear and overcast days, mean values of the refractive index for 18 intervals between 10 and 300 cm. above the surface. *Subject Headings:* **Refraction of light, Mirage.**—*C.E.P.B.*

2.1–179 551.593.5

Shifrin, K. S., **Koeffitsient rasseianiia sveta na bol'shikh chastitsakh.** [The coefficient of scattering of light on large particles.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 14(1):64–69, Jan.–Feb. **1950.** fig., 9 refs., equations. **DLC**—Mie's formula (1908) gives a coefficient of scattering of πa^2 for particles which are large in proportion to the wave length of the light. Investigations by the author show that part of the coefficient is determined by internal refraction and part by (external) diffraction. The total scattering should, therefore, be $2\pi a^2$. This paper develops this formula in detail. *Subject Headings:* **Scattering coefficient, Optical phenomena.**—*M.R.*

2.1–180 551.593.63:551.578.4

Polli, Silvio, **Penetrazione delle radiazioni luminose nel ghiaccio e nella neve.** [Penetration of luminous radiation in ice and snow.] *Annali di Geofisica*, 3(3):371–377, July **1950.** 4 tables, 4 refs. **MH-BH**—The coefficients of extinction and the relationships between the intensity of illumination of incident and transmitted light in ice and snow has been determined under natural conditions for radiation corresponding to the colors violet, blue, green, bright red and dark red. For ice and for snow the coefficients of extinction are ten and one hundred times, respectively, greater than that for water. The experimental procedure is described. *Subject Headings:* **Refraction of light, Ice, Snow, Extinction coefficients.**—*I.L.D.*

ELECTRICAL PHENOMENA

2.1–181 551.594

*Ambrosetti, Fl., **Luftelektrische Messungen in Locarno-Monti.** [Atmospheric-electricity measurements at Locarno-Monti.] *Schweizerische Meteorologische Zentralanstalt, Annalen* (Vol. 1944): 12–18 **[1945].** 6 figs., 4 tables, 8 refs. (Reprint available.) **MH-BH**—Results of measurements made from Nov. 1941 to March 1944 tabulated, shown graphically and discussed analytically. Number of small, medium and large ions shown in their diurnal and annual frequency. Conductivity in 75–80% of cases lay between 20 and 120×10^{-6}E.S.E. Extreme values varied from 0 to 352 for positive and 309 for negative ions. Results compared with those at Davos, Agra and Potsdam. *Subject Headings:* **Atmospheric electricity, Atmospheric conductivity, Locarno-Monti, Switzerland.**—*M.R.*

2.1–182 551.594

Pluvinage, Philippe and Taylor, G., **Mesures du champ éléctrique de l'atmosphère au Groenland entre le niveau de la mer et le centre de l'inlandsis.** [Measurements of the atmospheric electric field in Greenland between sea level and the center of the icecap.] *Annales de Géophysique*, 6(1):69, Jan.–March **1950.** Tables, 2 refs. **MH-BH**—The author presents the results of measurements of the electric field of the atmosphere in Greenland during the summers of 1948 and 1949. The atmospheric electricity increases from the coast to the icecap. In the case of the coastal station and the most inland station the values obtained during 1948 and 1949 were of the same order of magnitude, about 70 and 120 volts respectively;

for the intermediate station the values differed considerably. The electric field over the ice cap is characterized by marked daily variations. Negative potential values were observed in 1948 but not in 1949. *Subject Headings:* **Atmospheric electricity measurements, Greenland.**—*I.L.D.*

2.1–183 551.594:551.507.351

*Rossmann, Fritz, **Luftelektrische Messungen mittels Segelflugzeugen.** [Atmospheric electricity measurements made by gliders.] *Deutscher Wetterdienst in der US-Zone, Berichte*, No. 15, **1950.** 54 p. 32 figs., 35 graphs, 13 refs., 13 equations. **MH-BH**—Theory, instrumentation, calibration, methods of observation and results of flights given in great detail. Observations of dust charges and lightning also included. *Subject Headings:* **Atmospheric electricity measurements, Gliders.**—*M.R.*

2.1–184 551.594(09)

Fedorov, Evgeniĭ K., **"Slovo o iavleniiakh vozdushnykh ot elektricheskoĭ sily proiskhodiashchikh" Lomonosova i sovremennoe predstavlenie ob atmosfernom elektrichestve.** ["A word about atmospherical phenomena of electrical origin" by Lomonosov, and the present concept of atmospheric electricity.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 14(1):25–36, Jan.–Feb. **1950. DLC**—Historical note attempting to show that Lomonosov presented the basic concepts of present day atmospheric electricity theory, 200 years ago. *Subject Headings:* **Atmospheric electricity, History, M. V. Lomonosov.**—*M.R.*

2.1–185 551.594.1

Israël, Hans, **Die Tagesvariation des elektrischen Widerstandes der Atmosphaere. (Studien ueber das atmosphaerische Potentialgefaelle II.)** [Diurnal variation of electric resistance of the atmosphere. (Studies of atmospheric potential gradient II.)] *Annales de Géophysique*, 5(3):196–210, July–Sept. **1949.** 8 figs., 20 refs., 7 equations. French and German summaries p. 196. **MH-BH**—The author discusses the relationship between thunderstorms and the electric properties of the atmosphere. Over the oceans the daily course of potential gradient runs parallel to the daily total of thunderstorms occurring over the earth. Over land, potential gradient is influenced largely by local factors; hence at least two of the three electric properties: field intensity, conductivity and vertical current, must be measured simultaneously in order to determine the variability of the "columnar resistance" of the atmosphere. The daily march of the "columnar resistance" over the period of a year has been studied for eleven stations distributed over the entire earth. Variations in the "columnar resistance" coincide in the six European stations; the stations in America, east Asia and west Australia show almost inverse daily variations. *Subject Heading:* **Atmospheric electricity.**—*I.L.D.*

2.1–186 551 594l.11

Markgraf, Hans, **Zweiter Bericht über Messungen des luftelektrischen Spannungsgefäles bei Hamburg.** [Second report on measurements of atmospheric electric potential gradient at Hamburg.] *Annalen der Meteorologie*, 3(7–8):249–252, **1950.** fig., 2 tables. **DWB**—The first report for 1925 was in Annalen der Hydrolographie 1927. This discusses measurements for 1927 and 1928 (absolute values, diurnal variation). *Subject Headings:* **Potential gradient, Hamburg, Germany.**—*C.E.P.B.*

2.1–187 551.594.2:551.574.1

Leistner, Walter, **Der Verlauf des luftelektrischen Potentialgradienten und der Kernzahlen beim Durchgang einer Böe.** [The course of atmospheric electric potential gradient and nuclei counts through a squall.] *Annalen der Meteorologie*, 3(7–8):246–248, **1950.** fig., 3 refs. **DWB**—After an introduction on the theory of electric field oscillations during passage of a thunderstorm, author illustrates variations of nuclei and potential gradient in one hour during a squall from NW on 14.2.50. After varying between 35 and 80 v/m. gradient rose to 140 v/m., reversed and then rose to 250 v/m. at time of squall; after squall, oscillated between − and +. The nuclei counts also showed marked oscillations with maxima accompanying negative gradient, and minima accompanying positive gradient. *Subject Headings:* **Electricity of disturbed weather, Potential gradient, Nuclei count.**—*C.E.P.B.*

2.1–188 551.594 221:551.594.6

†Golde, R. H., **"Sferics" and the lightning discharge.** *Meteorological Magazine, London,* 79(940):277–286, Oct. 1950. 6 figs., 3 photos, 25 refs. **MH-BH**—An excellent account of the various stages in a lightning stroke to earth and the field changes to which they give rise on the ground. The faintly luminous step-leader stroke causes a gradual "a" field change as the negative charge is lowered to earth; the very rapid return stroke causes an equally rapid "b" change, followed by a gradual "c" change with removal of some of the remaining cloud charge. These give smooth field changes within 50 km. or so of the stroke. At distances of 400 km. upwards induction and radiation due to the violent return stroke become important and introduce the oscillatory field changes which are observed. The form of these is illustrated at distances of 400 to above 3000 km., and the evaluation of their magnitude is set out. *Subject Headings:* **Sferics, Lightning.**

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON GENERAL AND EXTENDED FORECASTING

By: *Charles Ernest Pelham Brooks*

EXPLANATORY NOTE

The following bibliography includes in **Section I** general works on methods of forecasting for periods exceeding two days, and in **Section II** works on *extended forecasting* for periods from three days to less than a month. *Long Range Forecasting* (for periods from a month upwards) will comprise a separate bibliography to be published in the next issue. Most of the works listed here deal either implicitly or explicitly with *extended forecasting*, but some have been included which, though not directly concerned with this subject, have historical interest as the basis for later developments.

Considerable help was obtained from an unpublished "Bibliography on long range forecasting" (prepared by WALTER G. LEIGHT and used by permission of JEROME NAMIAS which covered the years 1940 to 1948.

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BIBLIOGRAPHY ON GENERAL AND EXTENDED FORECASTING

SECTION I. GENERAL

1919–1930

2A–1 551.509.33

Ekholm, Nils, **Om perioder i väderleken och därpå grundade förutsägelser, särskilt med avseende på vintersjöfarten på Bottniska viken.** [On periods in weather and forecasts based on them, with application to winter travelling in the Gulf of Bothnia.] *Skeppstjänstkommitterades Betänkunde, Stockholm*, 2:84–102, **1919.** 4 tables, refs. **DWB**—*Subject Headings:* **Weather forecasting, Periodicities, Gulf of Bothnia, Sweden.**

2A–2 551.509.33:633.1

Shaw, Sir William Napier, **The law of sequence in the yield of wheat for Eastern England, 1885–1905.** (In **The air and its ways.** Cambridge, University Press, **1923.** p. 170–180. 2 figs., 2 tables, 3 equations.) **DWB**—A periodicity of 11 years in wheat yield and its harmonics, and a correlation with preceding autumn rainfall, are described. This paper has attained importance as the first determination of a (double) symmetry point (in 1895–6). *Subject Headings:* **Weather forecasting, Symmetry points, Agricultural meteorology, England.**

2A–3 551.509.33(09)

Hellmann, Gustav, **Versuch einer Geschichte der Wettervorhersage im XVI Jahrhundert.** [Attempt at a history of weather forecasting in the 16th Century.] *Berlin, Preussische Akademie der Wissenschaften, Phys.-Math. Klasse, Abhandlungen*, No. 1:1–54, **1924.** tables, refs. **DWB**—A catalogue of forecasts in astrological and agricultural calendars from 1500–1600 in different countries of Europe, mostly Germany, generally based on supposed planetary influences. An account of the development of weather prophecy is given. *Subject Headings:* **Weather forecasting, Planetary influences, History, Germany, Europe.**

2A–4 551.509.33:551.543.3

Matteuzzi, L., **Teoria matematica delle oscillazioni barometriche e previsione scientifica del tempo.** [Mathematical theory of barometric oscillations and scientific weather forecasting.] *Direzione superiore del Genio e delle Costruzioni Aeronautiche, Rendiconti tecnici, Rome*, 12(3), May **1924.** 13 p. fold. plate. **GB-MO**—Account of a method of periodogram analysis applied to barograms which shows that these have a periodic structure due to a limited number of sine curves. These are classified as short (1¾–2½, 4–4½, 6 and 8 days), medium (12–24 days) and long (1–12 months). An example of an analysis and synthesis for Jan. 26 to March 4, 1924 is given. *Subject Headings:* **Weather forecasting, Pressure waves, Periodogram analysis.**

2A–5 551.511

Bartels, Julius, **Gezeitenschwingungen der Atmosphäre.** [Tidal oscillations of the atmosphere.] *Handbuch der Experimentalphysik*, 25 Teil I:163–210, **1928.** 22 figs., tables, refs., 36 equations. **DWB**—A highly mathematical discussion of the theory of atmospheric oscillations. After setting out the necessary assumptions, author analyzes analogy with ocean tides, substituting equivalent

height of atmosphere for depth of ocean. In Pt. 4 he calculates the oscillations on a stationary earth and in Pt. 5 the modifications due to rotation. Pt. 6 calculates the resonance depths and Pt. 7 the forced oscillations. The role of friction is discussed; its chief effect is to keep the oscillations finite. In Pt. 12 the air movements resulting from pressure waves are considered. *Subject Headings:* **Weather forecasting, Pressure waves, Frictional effects.**

2A–6 551.509.33

Tikhomirov, E. I., **Osnovnye priemy predskazaniĭ na dolgiĭ srok.** [Basic methods of long range forecasts of the weather.] *Zhurnal Geofiziki i Meteorologii*, 6(1,2):33–52, 127–137, **1929.** 7 figs., table, numerous refs., 3 equations. English summary p. 52, 137. Title varies. **DWB, DLC**—Pt. 1 includes methods based on harmonic analysis, Pt. 2 correlation and Pt. 3 the method of symmetry points, investigating conditions in which it may prove serviceable. [Other parts may have been published but are not available.] *Subject Headings:* **Weather forecasting, Harmonic analysis, Correlations, Symmetry points.**

2A–7 551.509.33

Gregory, Sir Richard, **Weather recurrences and weather cycles.** *Royal Meteorological Society, Quarterly Journal*, 56(234):103–120, April **1930.** 2 figs., 33 refs. **DWB**—A popular account of cycles of 3–31 days, Buchan cold and warm spells and long period cycles, ending with an account of attempts at long range forecasting by weather cycles in subtropical latitudes. *Subject Headings:* **Periodicities, Weather forecasting.**

1931–1935

2A–8 551.509.33

Normand, C. W. B., **Some problems of modern meteorology. No. 6. Present position of seasonal weather forecasting.** *Royal Meteorological Society, Quarterly Journal*, 58(243):3–10, Jan. **1932.** 8 refs. **DWB. Some problems of modern meteorology.** Royal Meteorological Society, 1934. p. [43]-[50]. **DWB**—Brief discussion of forecasting by sunspots, periodicities, seasonal pressure charts and correlation. Emphasis on performance tests on subsequent data and significance tests (Walker, Fisher) and standard of accuracy (Walker's 4–1 rule). *Subject Headings:* **Weather forecasting, Sunspots, Periodicities.**

2A–9 551.509.33:523.74

Scultetus, H. R., **Langfristige Wettervorhersage.** [Long range weather forecasts.] *Germany, Reichsamt für Wetterdienst [Deutsches Flugwetterdienst], Erfahrungsberichte, Sonderband*, 3:69–76, **1932.** numerous refs. **DWB**—The many works on dependence of weather on solar activity are of hardly any use for long range forecasting; the magnetic character figure is more useful than sunspot relative number. In view of relation of earthquakes and eruptions to solar activity author proposes a "catastrophe warning service" which requires only forecasting solar activity, a problem already solved by author but not yet published. General article only. *Subject Headings:* **Solar influences, Sunspots, Weather forecasting.**

2A–10 551.509.33:523.72

Abbot, Charles Greeley, **Sunspots and weather.** *Smithsonian Miscellaneous Collections*, 87(18), Nov. **1933.** 10 p. 5 figs. **DLC. Solar radiation and weather studies.** *Ibid.*, 94(10), Aug. 1935. 89 p. 38 figs., 3 plates, 13 tables. **DLC**—*Subject Headings:* **Solar radiation, Sunspots, Weather forecasting.**

2A–11 551.509.33

Brooks, C. E. P., **Long-range weather forecasting.** *Meteorological Magazine, London*, 63(748):81–86, May **1928.** 9 refs. Rev. *Ibid.*, 73(874):257–262, Nov. **1938.** Title varies. **DWB**—Brief summary of various methods as applied to the British Isles, with special reference to tendencies and (in 1928) weekly forecasts in *The Times*. *Subject Headings:* **Weather forecasting, Great Britain.**

2A–12 551.509.33

Argentine Republic. Dirección de Meteorología, Geofisica e Hidrología, **Pronósticos meteorológicos a largo plazo. Informes de la Comisión Oficial designada par el Ministerio de Agricultura de la Nación.** [Long range weather forecasts. Report of the Commission appointed by the Ministry of Agriculture.] *Ser. E*, 1, **1934.** 62 p. **DLC**—After chapters on forecasting in general and short range forecasts, Chap. 3 of the majority report discusses the various methods of long range forecasting, their results and the public reactions to them. Chap. 4 examines the possibility of official long range forecasts in Argentina. In Chap. 5 it is concluded that such forecasts are not practicable. J. Jagsich presented a minority report recommending further investigations. *Subject Headings:* **Weather forecasting, Argentina.**

1936–1940

2A–13 551.509.33

Tu, Chang-wang, **Physical basis of long-range forecasting; a critical study.** *Meteorological Magazine, Nanking*, 12:545–559, **1936.** In Chinese, English summary p. 545. **MH-BH**—Discusses methods based on periodicity, variations of solar activity and solar constant, centers of action. Emphasis is laid on the relation between the general circulation of the atmosphere and variations in solar radiation; the opinion is expressed that a big advance cannot be made until this is understood. *Subject Headings:* **Atmospheric circulation, Solar radiation, Weather forecasting.**

2A–14 551.509.33

Basu, S., **Medium-range weather forecasts.** *National Institute of Sciences of India, Proceedings*, 5:61–71, **1939.** 4 refs. Discussion. *Ibid.*, p. 71–73. 3 refs. **DLC**—Discusses Baur's 10-day forecasts and Russian forecasts for variable periods. *Subject Heading:* **Weather forecasting.**

2A–15 551.509.33:523.7

Clayton, Henry Helm, **The 11-year and 27-day solar periods in meteorology.** *Smithsonian Miscellaneous Collections*, 99(5), June **1940.** 20 p. 13 figs., 2 tables, refs. **DLC, DWB**—Shows world charts of pressure deviations at sunspot maxima. Mean annual pressure in tropics (Quixeramobim and Antananarivo) varies opposite to sunspots. Other relations discussed include daily sunspots and pressure in two regions of North Atlantic and North Pacific (general agreement in 60°N, opposition in 30°N). Correlations given and mapped, mostly small. Harmonics of 27-day period also show relations to weather in North America. Relations of world climatic changes since 1900 to solar changes briefly discussed. *Subject Headings:* **Sunspots, Correlations, Harmonic analysis, Weather forecasting.**

2A–16 551.509.3

Shaw, Sir William Napier, **Forecasting for long periods. Broadcasts of monthly summaries.** (In his **Forecasting weather.** 3rd ed. London, Constable, **1940.** Chap. 32, p. 614–620. 2 figs.) **DLC**—Gives a general account of forecasting by correlation, seasonal forecasts in India, and Baur's 10-day forecasts. *Subject Headings:* **Weather forecasting, Correlations, India.**

2A–17 551.509.33

†United States Weather Bureau, **Reports on critical studies of methods of long-range weather forecasting.** *Monthly Weather Review, Supplement*, No. 39, **1940.** W.B. No. 1268. 130 p. numerous figs., tables, refs. **DWB**—Contents:

Montgomery, R. B., **Report on the work of G. T. Walker.** p. 1–22. 11 figs., tables, 68 refs.—Summarizes Walker's work on correlations, world weather oscillations, periodicity and forecasting monsoon rains of India.

Montgomery, R. B., **Verification of three of Walker's seasonal forecasting formulae for India monsoon rain.** p. 23–24. 2 tables, 6 refs.—Out of 8 factors used in correlation forecasts, 4 have become negligible, one has reversed its sign, and 3 have stood up. Slight success.

Montgomery, R. B., **Report on the work of S. K. Savur of India.** p. 25–26. 3 tables, 10 refs.—Describes two formulas for Indian monsoon forecasting.

Schell, I. I., **Polar ice as a factor in seasonal weather.** p. 27–51. 83 refs.—Summary and discussion of the work of numerous investigators.

Montgomery, R. B., **Discussion of some theories on temperature variations in the North Atlantic Ocean and in the atmosphere.** p. 52–57. 7 figs., 4 refs.—Mainly a discussion of the work of B. Helland-Hansen and F. Nansen.

Montgomery, R. B., **Summary of the methods used at the Scripps Institution of Oceanography.** p. 58–62. 2 figs., 3 tables, 37 refs.—Describes methods of forecasting rainfall and temperature in South California based on ocean surface temperatures and on periodicities of 5–6 and 22–33 years.

Schell, I. I., **Baur's contribution to long-range weather forecasting.** p. 63–87. 19 figs., 69 refs.—Pt. I deals with Baur's work on monthly and seasonal forecasting, concluding that by Baur's methods no seasonal forecasts of decided value could be obtained for Germany. Pt. II deals with 10-day forecasts by multiple correlation; these are regarded as capable of giving valuable forecasts.

Page, Larry F. and Clapp, Philip F., **Verification of Baur's ten day forecasts.** p. 88–91. 2 tables.—Baur's forecasts have little value after first 5 days.

Schell, I. I., **A preliminary summary of the Multanovski school of long-range weather forecasting.** p. 92–96.

Willett, H. C., **General remarks on Multanovski's method of forecasting.** p. 96.

Page, Larry F., **Introduction to reports on variations of the solar constant as a factor in long-range weather forecasting.** p. 97.—Historical summary.

MacPherson, Herbert G., **Accuracy of Smithsonian Institution solar constant measurements.** p. 98–117. 8 figs., equations.—Standard error of a single pyrheliometer reading estimated as 0.37%

of solar constant. S.E. of solar constant derived by long method 0.59% which equals S.E. of daily values. Thus any real variations of solar constant are completely masked.

Page, Larry F., **Comparison of contemporaneous measurements of the solar constant.** p. 118–120. 5 refs.—Correlation of daily values at different stations insignificant.

Page, Larry F., **Some statistical tests of solar constant-weather relationships.** p. 121–130. 7 figs., table, 6 refs. Unfavorable result.

Willett, Hurd C., **Review of H. H. Clayton on long-range weather changes and methods of forecasting.** p. 126–130. 4 figs.—Only 54% of Clayton's quarterly forecasts were correct.

A good critical review of the above is contained in: Allen, R. A., **A review of some methods of long-range forecasting.** *U. S. Weather Bureau, Technical Note,* Oct. 8, 1942. **DWB**—*Subject Headings:* **Solar radiation, Correlations, Ocean currents, Sunspots, Weather forecasting.**

1941–1945

2A–18 551.513

Arakawa, H., **Statistische Untersuchungen atmosphärischer Zirkulationsschwankungen.** [Statistical investigation of variations of atmospheric circulation.] *Meteorologische Zeitschrift,* 58(5):183–184, May **1941.** 2 tables, 5 refs. **DWB**—From figures of monthly mean zonal and meridional gradients Aug. 1937–July 1939 in "Mitteleuropäischer Witterungsbericht," author calculated correlations between mean meridional circulation (40–75°N) in various longitudes and zonal circulations in 40, 50, 60 and 70°, obtaining high positive values. This shows that the zonal and meridional circulations are closely related. Constants of regression equations given. *Subject Headings:* **Atmospheric circulation, Correlations, Weather forecasting.**

2A–19 551.509.33:517.512.2

Walker, Sir Gilbert T., **Period hunting in practice.** *Royal Meteorological Society, Quarterly Journal,* 67(288):15–18, Jan. **1941.** 2 figs., 8 refs. **DWB**—Methods of reducing labor in periodogram analysis, tests of reality and sampling errors. Effect of damping, advantages of correlation periodogram (correlogram). *Subject Headings:* **Weather forecasting, Periodogram analysis.**

2A–20 551.509.318

Flohn, Hermann, **Kalendermässige Bindungen im Wettergeschehen.** [Connections between weather sequence and the calendar.] *Naturwissenschaften,* 30(48–49):718–728, Nov. 27, **1942.** 6 figs., 27 refs. **DLC**—A discussion of "singularities" defined as "typical weather situations which occur more or less regularly on about the same calendar dates." Attributed to dominant waves which are harmonics of the year; anticyclones show symmetry points about Dec. 21 and June 17 and stormy periods have weaker symmetry about Jan. 13 and July 13. *Subject Headings:* **Pressure waves, Symmetry points, Weather types, Singularities, Weather forecasting.**

2A–21 551.509.33

Gião, António, **Solution générale du problème de la prévision mathématique du temps à échéance quelconque.** [General solution of weather forecasting over any period.] *Sociedade de Geografia de Lisboa, Boletim,* 60(7–8):233–272, July–Aug. **1942.** 3 figs., 58 equations. **DLC**—Considers the evolution of a field of pressure as a closed space which obeys certain general laws of geometry. After a long, highly mathematical discussion a very complex equation is developed defining an undulatory function determined by harmonic analysis in time, or space and time. Meteorological variables satisfy the necessary conditions. No direct application is made to forecasting and it is not clear how this could be done. *Subject Headings:* **Pressure waves, Periodicities, Pressure fields, Weather forecasting.**

2A–22 551.515.8

Arakawa, H., **On the large scale anticyclonic trajectory of polar air, the formation of orographic depressions in Japan, and the average track of transcontinental barometric centres.** *Meteorological Society of Japan, Journal,* 21(10):443–447, Oct. **1943.** In Japanese, English summary p. (23)–(24). fig. **GB-MO**—The anticyclonic trajectory of a polar air mass in a barotropic atmosphere is examined mathematically. An equation by Rossby is shown to give increasing anticyclonic motion as it moves south. When it meets a mountain ridge the result is a shallow depression to lee and a ridge of high pressure to windward. This is illustrated in Japan and U. S. A. *Subject Headings:* **Anticyclones, Orographic effects, Weather forecasting, Japan, United States.**

2A–23 551.509.33:551.521.13

Abbot, Charles Greeley, **Solar variation and weather.** *Smithsonian Institution, Report* **1944,** p. 119–153+. 21 figs., 2 plates, 4 tables, 2 refs. **DSI**—After a general introduction on solar radiation, author discusses effect of sequences of rising and falling solar activity on weather and shows curves of observed and predicted Washington daily temperatures. A 27-day period in Washington

rainfall is described. Periodicities in solar radiation are set out and the claim is made that these are reflected in periodicities of weather. *Subject Headings:* **Solar radiation, Periodicities, Weather forecasting, Washington, D. C.**

2A–24 551.509.33

Malurkar, S. L., **A preliminary survey on medium-long-range forecasting of rain over India.** (In his **Forecasting weather in and near India.** Bangalore, [publ. by author], **1945.** p. 118–125.) **GB-MO**—Walker's statistical relation between South American pressure and Indian rainfall a month later is explained by the travel of "pulses" of air over the intervening 12,000 miles, guided by pressures in other regions. The explanation covers the statistical relations. "Weather in winter months over India with special reference to Western disturbances," *ibid.*, p. 101–117. This has some bearing on extended forecasting (3–6 days). *Subject Headings:* **Correlations, Weather forecasting, India.**

2A–25 551.509.3(02)

Schmauss, A., **Das Problem der Wettervorhersage.** [The problem of weather forecasting.] 5th ed. Leipzig, Becker und Erler, **1945.** 138 p. (*Probleme der kosmischen Physik*, Vol. 1.) **DLC**—Chap. 16 (p. 81–108) deals briefly and generally with long range forecasting—analogues from libraries of weather charts, relations between distant regions, waves, sunspots. The German National Institute for Long-range Forecasts is described and an account given of Baur's forecasts by the general weather situation. *Subject Headings:* **Analogues, Pressure waves, Correlations, Sunspots, Weather forecasting, Textbooks.**

1946–1950

2A–26 551.509.33

Berkes, Zoltán, **A hosszabbtartamú idöjárásjelzés alapjai hazánkban.** [Methods of long range weather forecasting in Hungary.] *Idöjárás*, 50(9–12):74–78, Sept.–Dec. **1946.** 15 refs. English summary p. 109–110. **DWB**—Long range forecasting began in 1938 with a nearly 28-day periodicity of temperature and variability of pressure. Other factors now used include sunspots and wind speed, singularities, periodicities of 29.53 days (lunar synodic cycle), 45, 56, 72, 90 and 200 days, and extrapolation of 5-day pressure variations at Budapest. *Subject Headings:* **Weather forecasting, Periodicities, Hungary.**

2A–27 551.509.318

Brooks, C. E. P., **Annual recurrences of weather: "singularities." Pt. I, II.** *Weather*, 1(4, 5):107–113, 130–134, Aug., Sept. **1946.** 4 figs. table. **DWB**—Gives a list of stormy and anticyclonic periods in western Europe which recur at about the same time in most years. In Pt. II the cold spell of late spring, the "European monsoon," the "Old Wives' Summer," the stormy period of late November and the Post-Christmas depression are discussed. *Subject Headings:* **Singularities, Weather forecasting, Europe.**

2A–28 551.509.33

†Pagava, S. T., **Osnovy sinopticheskogo metoda dolgosrochnykh prognozov pogody maloĭ zablagovremennosti.** [Principles of the synoptic method of long range weather forecasting for short periods.] Moscow, Gidromet, Izdat., **1946.** 76 p. 45 figs. (incl. synoptic charts), 19 tables, 58 refs. (*SSSR, Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby, Nauchno-issledovatel'skikh Uchrezhdeniĭ, Trudy, Ser. II* [*Sinopticheskaia Meteorologiia*] No. 20.) **DWB**—In the first part of this monograph the author discusses the history of long range forecasting in the USSR as started in 1909 and continued under Multanovskiĭ (1913–1941) and later by others at the Institute in Leningrad. He reviews the application of the concepts of "Natural Synoptic Periods," "Axes" and "Hearths" or "Centers of Action" along which air masses move or are transformed. Three pages are devoted to a report on methods used in the USA from 1908 to 1942 under the influence of Mitchell, Rossby, Namias, Holzman, Krick, Elliot and others, and of methods used in Germany by Baur (1929–date) and criticism of the American, German and Russian systems by Schell and others. Then he goes into greater detail, supported by schematic or actual synoptic and composite charts for Eurasia, concerning the application of the concept of Natural Synoptic Periods in analysis, forecasting and verification of 4,000 forecasts, using 500 mb. topography and tendency charts. A chapter on verification of the short-period (5-day) forecasts based on this system compared with "control" forecasts based on climatology or "persistence," gives in tabular form the results, showing some degree of skill. The three page bibliography shows fairly complete knowledge of the domestic and foreign literature up to 1944; the latest publication referred to being a manuscript by I. A. Kibel' on the application of his second approximation to forecasting, dated 1945. The author claims improvement over methods of Multanovskiĭ, on whose work most of this report is based, by the introduction of "Advective-Dynamic" or "Aerosynoptic" analysis concepts, in other words, by using charts of baric topography

and isallohyps charts for natural synoptic periods. The work ends with the statement that it is necessary to improve the quality of the aerological observations before it will be possible to perfect a method of quantitative long range forecasting. *Subject Headings:* **Weather forecasting, Synoptic analysis, History, U.S.S.R., United States, Germany.**—*M.R.*

2A–29 551.509.3(02)

Khromov, Sergeĭ Petrovich, **Osnovy sinopticheskoĭ meteorologii.** [Principles of synoptic meteorology.] Leningrad, Gidromet. Izdat., **1948.** 696 p. 277 figs., 6 fold. charts, biblio. p. 684–696. In Russian. **GB-MO**—The last part of Chap. 10 discusses extended and long range forecasting. Paragraph 87, Correlation, deals mostly with European temperature and also with the method of anomalies of M. A. Omshans'kiĭ (**Prognoz temperatury na neskol'ko dnei.** Trudy G. G. O. 26, 1939); 88, Periodic processes in the atmosphere; 89, Multanovskiĭ's methods; 90, American methods of extended forecasting. *Subject Headings:* **Weather forecasting, Textbooks.**

2A–30 551.509.33(02)

Baur, Franz, **Einführung in die Grosswetterkunde.** [Introduction to "broad-weather" study.] Wiesbaden, Dieterich, [**1948**]. 165+p. 40 figs., 20 tables, refs. **DLC.** Review in *American Meteorological Society, Bulletin*, 30:299–300, 1949. **DLC, DWB**—Sequence of general weather types, especially in Europe, is discussed. Importance of stratosphere pressure distribution and steering emphasized. General atmospheric circulation analyzed into planetary and monsoonal; and world weather patterns based on them, described. Effect of terrestrial influences considered. Periodic variations and singularities are supported but symmetry points are regarded as of little or no use. Effect of solar variations is accepted. Last chapter describes Baur's own synoptic statistical method of extended forecasting. Use of statistics in meteorological analysis is discussed in an appendix. (*See item* 1–55, *Meteorological Abstracts and Bibliography*, 1(1), Jan. 1950.) *Subject Headings:* **Atmospheric circulation, Sunspots, Weather forecasting, Textbooks.**

2A–31 551.509.33

Hofmann, Alfred, **Fragen der Mittel- und Langfristvorhersage.** [Problems of medium and long range forecasting.] *Wetter und Klima*, 1(7–8):204–210, July–Aug. **1948. DWB**—General discussion on form and method of issue of forecasts. Methods are suggested for obtaining sufficient material for statistical checks by breaking down seasonal or monthly forecasts into shorter periods. Practical use of forecasts is also referred to. *Subject Headings:* **Forecast verification, Weather forecasting.**

2A–32 551.509.33

Seilkopf, Heinrich, **Langfrist-Vorhersagen.** [Long range forecasts.] (In **Meteorology and Physics of the Atmosphere,** Müggе, Ratje (ed.). Wiesbaden, Office of Military Government for Germany, **1948.** Vol. 19:196–204. 14 refs. [*FIAT Review of German Science* 1939–1946.]) **DLC**—An excellent, brief account of the present situation. Methods of long range forecasting are divided into synoptic (typical weather situations, analogues, singularities, anomalies); chronological (analogues, collective studies such as daily rainfall frequency by districts, periodicities and rhythms); correlation methods. *Subject Headings:* **Weather types, Correlations, Periodicities, Analogues, Weather forecasting.**

2A–33 551.590.21

Prudhomme, André, **Les répercussions de l'activité solaire sur la météorologie.** [The repercussions of solar activity on meteorology.] *France, Météorologie Nationale, Notice d'instructions Techniques*, 23, Pièce No. 1, **1950.** 14 p. (Duplicated.) **GB-MO**—After summarizing briefly literature of solar relations with upper atmosphere, pressure, temperature and rainfall, author considers that the main solar effect is through absorption of both solar and terrestrial radiation by ozone layer, but the details are not yet known and are often local. For application to forecasting, the first need is to forecast solar activity, and this will not be solved by forecasting numbers of sunspots. *Subject Headings:* **Solar influences, Ozone layer, Weather forecasting.**

SECTION II

EXTENDED FORECASTING (FROM 3 DAYS TO LESS THAN A MONTH)

1886–1900

2A–34 551.515:551.509.318

§Van Bebber, W. J., **Handbuch der ausübenden Witterungskunde. 2. Theil. Gegenwärtiger Zustand der Wetterprognose.** [Handbook of practical weather science. Pt. 2. Present position of weather forecasting.] Stuttgart, Ferdinand Enke, **1886.** 503 p. 66 figs. **GB-MO**—Although

not dealing directly with extended forecasting, this work includes much fundamental information about tracks of depressions and anticyclones, including the standard numbered tracks over Europe (fig. 32) and the associated general pressure and temperature distributions. Also describes types of weather in different countries. *Subject Headings:* **Anticyclones, Depressions, Weather types, Extended forecasting.**

2A–35 551.5(02) 551.509.318

§Abercromby, Ralph, **Weather: a popular exposition of the nature of weather changes from day to day.** London, Kegan Paul, Trench & Co., **1887.** 472+p. 96 figs., tables. **DWB.** Rev. by A. H. R. Goldie, London, Kegan Paul, Trench, Trubner, 1934. 274 p. 71 figs., 7 tables, refs. at end of chapters. **DWB**—"Types and spells of weather" (p. 189–224 of rev. ed.) illustrates Abercromby's well-known types (Sly, Wly, Nly, Ely), their persistence and frequency. *Subject Headings:* **Weather types, Extended forecasting.**

2A–36 551.511

Margules, Max, **Luftbewegungen in einer rotierenden Sphäroidschale bei zonaler Druckvertheilung. Theil I, II.** [Air movements in a rotating spheroidal shell during zonal pressure distribution. Part I, II.] *Vienna, Akademie der Wissenschaften, Sitzungsberichte, Math.-Naturw. Klasse,* 101(2a):597–626, April **1892.** Also *ibid.,* 102(2a):11–56+, Jan. 1893. figs., tables, refs., equations. Title varies. **DWB**—A fundamental theoretical study of vibrations of an atmosphere on a rotating earth, including effects of friction. Very quick waves move against rotation and slower waves with rotation. Isobars are meridians and parallels between which centers of high and low pressure are arranged alternately (tesseral vibration). Owing to friction these isobars become curved in the direction of propagation of the waves, the periods become longer and the waves are damped. *Subject Headings:* **Pressure waves, Frictional effects, Extended forecasting.**

2A–37 551.509.318

Archibald, Douglas, **Weather types in relation to long-period forecasting.** London, Eyre and Spottiswoode, **1898.** 19 p. 2 plates, 4 tables. **GB-MO**—From a discussion of the work of Abercromby, Köppen and Van Bebber on weather types, author considers that when the establishment of a given type is recognized, a 4-day forecast may be based on persistence. Hints given about different types. Long range forecasts on the same basis are also discussed. *Subject Headings:* **Weather types, Extended forecasting.**

1901–1920

2A–38 551.509.33

§Clayton, Henry Helm, **A proposed new method of weather forecasting by analysis of atmospheric conditions into waves of different lengths.** *Monthly Weather Review,* 35:161–167, **1907.** 28 figs. (incl. synoptic charts), 4 refs. **DWB**—Variations of all meteorological elements at any place can be analyzed into series of waves which are similar in length at different stations but not in phase, drifting from west to east with speed inversely proportional to wave length. Charts show progressive movements of temperature waves across U. S., Feb. 23–March 4, 1899. *Subject Headings:* **Temperature waves, Extended forecasting.**

2A–39 551.509.312

§Ekholm, Nils, **Über die unperiodischen Luftdruckschwankungen und einige damit zusammenhängende Erscheinungen.** [On non-periodic oscillations of pressure and some connected phenomena.] *Meteorologische Zeitschrift,* 24:1–11, 102–113, 145–159, **1907.** 9 figs., 5 tables, refs., 2 equations. **MH-BH**—This early paper sets out the theory of forecasting by isallobars. Although directly concerned only with daily forecasting, it formed the inspiration for some of the work on longer range forecasts by persistence of upper air "steering." *Subject Headings:* **Isallobars, Steering, Extended forecasting.**

2A–40 551.577.33

Defant, A., **Die Veränderungen in der allgemeinen Zirkulation der Atmosphäre in den gemässigten Breiten der Erde.** [The changes in the general circulation of the atmosphere in the temperate latitudes of the earth.] *Vienna, Akademie der Wissenschaften, Sitzungsberichte,* 121(2a):379–586, **1912.** 24 figs., 63 tables, refs., 7 equations. **DWB.** Summary in *Meteorologische Zeitschrift,* 30:58–66, 126–138, 1913. 3 refs. **DWB**—In Pt. I, taking daily rainfalls of whole regions author finds periodicities of approximately 6, 12, 16 and 31 days in the Southern Hemisphere (lengths shorter in winter than summer) and 5½, 8.7, 12½ and 24–25 days in Northern Hemisphere. Calculating speed and wave lengths he found four travelling waves of lengths approximately 90, 120, 180 and 360° of longitude. Pt. II deals with the theory of the general circulation in temperate latitudes, including the influence of land and sea distribution, and compares theory and observation. In Pt.

III the conditions in North America, Europe and Japan are discussed in greater detail, including the speed of propagation of the waves from one region to another, comparison with theory, and relation of variations of rainfall to pressure distribution. A remarkable pioneer paper on travelling waves. (Review by E. Gold, *Nature, London*, April 17, 1913. p. 174.) *Subject Headings:* **Atmospheric circulation, Periodicities, Extended forecasting.**

2A–41 551.509.33:551.543.3

Wenz, J., **Die 27-tägige Periodizität in den Luftdruckveränderungen.** [The 27-day periodicity in pressure changes.] Selbstverlag, [Self-published], **1916. GB-MO**—Unchecked. *Subject Headings:* **Pressure variations, Extended forecasting.**

2A–42 551.509.33:551.577

Quayle, E. T., **Tropical control of Australian rainfall.** *Australia, Bureau of Meteorology, Bulletin*, 15, [1919]. 24+p. 12 plates, tables. **DWB**—Periods of high minimum temperature in northern Australia and New Guinea are associated with or closely followed by heavy rain farther south. This leads to the possibility of general rainfall forecasts for 2–3 weeks ahead. *Subject Headings:* **Precipitation, Extended forecasting, Australia, New Guinea.**

2A–43 551.509.318

§Gold, E., **Aids to forecasting: types of pressure distribution. With notes and tables for the fourteen years 1905–1918.** Great Britain, Meteorological Office, *Geophysical Memoirs*, 2(16):148–174, **1920.** 28 figs., 3 tables. **DWB**—In the region of the British Isles 15 isobaric types with several subtypes are illustrated and daily charts 1905–1918 are classified accordingly. Primarily for daily forecasting but the notes about associated weather include some remarks on persistence. *Subject Headings:* **Weather types, Extended forecasting, Great Britain.**

1921–1925

2A–44 551.509.33:551.509.312

Tikhomirov, E., **Isallobarenkarten und langfristige Wettervorhersagen.** [Isallobar charts and long range forecasting.] *Meteorologische Zeitschrift*, 39:374–377, **1922. DWB**—Extends Ekholm's work (1907) on isallobars in daily forecasting to weekly forecasts, using high level pressure waves following the direction of isotherms. They are also discussed in connection with the work of Multanovskiĭ. Rules given for prognostic isobar charts. *Subject Headings:* **Isallobars, Extended forecasting.**

2A–45 551.509.33:523.72

Clayton, Henry Helm, **The use of observations of solar phenomena in weather forecasting in Argentina.** *American Meteorological Society, Bulletin*, 4:34–37, **1923. MH-BH**—Enunciates four rules about rises and falls of pressure following changes of solar radiation, and their progressive movements. In the discussion Prof. Marvin doubted the reality of fluctuations in the solar constant. *Subject Headings:* **Solar radiation, Extended forecasting, Argentina.**

2A–46 551.509.33:523.7

Clayton, Henry Helm, **World weather; including a discussion of the influence of variations of solar radiation on the weather and of the meteorology of the sun.** New York, Macmillan, **1923.** 393+p. figs., plates, tables, refs. **DWB**—Chap. 10 (p. 215–269. 35 figs., 8 tables), **"The sun and the weather,"** describes relations between daily and monthly changes of solar radiation and subsequent weather changes. Chap. 12 (p. 284–322. 12 figs., 4 tables, 11 refs.), deals with **"Periodicity in the weather and in solar phenomena."** Periodogram analysis of values of solar constant gave periodicities of 3.5, 5.6, 6.8, 9, 11 and 13 days. The 6.8 day period corresponds with a 7-day period in weather. The 11-year sunspot cycle in weather is also discussed. Part of Chap. 13 (p. 323–343. 11 figs.), is titled **"Forecasting the weather. Forecasts based on the relation of the weather to solar changes,"** and describes weekly forecasts for Buenos Aires begun Dec. 12, 1918. Author states: "The correlation between the observed and predicted temperatures is not high, but the belief seems justified that, whenever full and accurate day-to-day values of solar radiation are available, weather forecasts for all parts of the world may be made with an accuracy and for intervals not hitherto thought possible by scientific men." *Subject Headings:* **Solar radiation, Sunspots, Periodicities, Extended forecasting, Buenos Aires, Argentina.**

2A–47 551.509.33:551.543.3

Vercelli, F., **Nuovi esperimenti di previsioni meteorologiche.** [New experiments in meteorological forecasting.] *Rivista Marittima*, March **1923.** 80 p. plates. **GB-MO**—Forecasting by harmonic analysis of barograms. Waves found, 2–3, 4–6, about 8 and 16 days and about a month. Considerable success claimed. *Subject Headings:* **Harmonic analysis, Extended forecasting.**

2A–48 551.509.33:551.543.3

Danilov, L., **Khvili pogodi; novii metod sinoptichnogo analisu.** [Weather waves; new method of synoptic analysis.] German title: **Wetterwellen; Zur Kenntnis der langwährenden Witterungsperioden.** [Weather waves. On the knowledge of persistent weather cycles.] Ukrmet, Kiev, **1925.** 212+p. 54 figs., 25 tables, refs. German summary p. 185–212. 2 figs., refs., equations. Text in Ukranian. **DWB**—From the pressure charts of overlapping 2½ and 5 day means author finds tracks of centers of pressure anomaly. The 2½-day centers move eastwards, average speed 55 km./hr.; the 5-day centers pulsate. A periodogram analysis of pressures for a number of stations gave waves of 5–6, 7–9, 11–14, 20 and 30 days. The shorter waves are regarded as "overtones" of the 30-day wave given by $30/\sqrt{[p(p+1)]}$ where p has values of 1, 2, 3. . . . *Subject Headings:* **Pressure waves, Pressure anomalies, Extended forecasting.**

2A–49 551.543.3

Defant, A., **Schwingungen einer zweifach geschichteten Atmosphäre und ihr Verhältnis zu den Wellen im Luftmeer.** [The oscillations of a two-layer atmosphere and their relation to waves in the atmosphere.] *Beiträge zur Physik der freien Atmosphäre,* 12:112–137, **1925.** fig., refs., 61 equations. **DWB**—Waves form on the tropopause under the action of gravity. Rotation of the earth prevents stationary zonal oscillations but permits waves moving eastwards. If the discontinuity at the tropopause is 2°C., these have periods of 24, 12, 8 and 6 days. These are the primary cause of periodic changes of weather; in the troposphere they give rise to secondary disturbances which may exceed the primary ones in intensity, causing apparent temporary breaks in periodicity. *Subject Headings:* **Pressure waves, Periodicities, Extended forecasting.**

2A–50 551.509.33:523.72

Hoxmark, Guillermo, **Solar radiation and the weekly weather forecast of the Argentine Meteorological Service.** *Smithsonian Miscellaneous Collections,* 77(7), **1925.** 23 p. 5 figs., 20 tables. Introductory note by Charles Greeley Abbot. **DSI**—Weekly forecasts of temperature were based on solar radiation, solar faculae, terrestrial magnetism, atmospheric electricity and past weather. Forecasts for each day were correlated with observed temperatures and occurrences of rainfall; about three-quarters of the correlations were positive. *Subject Headings:* **Solar radiation, Solar faculae, Extended forecasting, Argentina.**

2A–51 551.509.317

Newnham, E. V., **Classification of synoptic charts for the North Atlantic for 1896–1910.** Great Britain, Meteorological Office, *Geophysical Memoirs,* 3(26):181–200, **1925.** fig., 4 tables, 3 refs. **DWB**—Daily synoptic charts for Atlantic north of 30°N, Greenland and western Europe are classified by location of anticyclones and depressions. Monthly frequencies of 10 types are given and briefly discussed. An index gives dates of 36 anticyclonic types. *Subject Headings:* **Anticyclones, Weather types, Extended forecasting.**

1926–1930

2A–52 551.509.33:551.543.3

Defant, Albert, **Primäre und sekundäre—freie und erzwungene Druckwellen in der Atmosphäre.** [Primary and secondary—free and forced pressure waves in the atmosphere.] *Vienna, Akademie der Wissenschaften, Sitzungsberichte, Math.-Naturw. Klasse,* 135(2a):357–377, **1926.** 2 figs., refs., 26 equations. **DWB.** Also *Austria, Zentralanstalt für Meteorologie und Geodynamik, Festschrift,* p. 83–103, 1926. 2 figs., refs., 26 equations. **DWB**—A mathematical exposition of pressure oscillations in the troposphere caused by the meridional temperature gradient modifying waves in the lower stratosphere. These lead to eastward wandering waves. The upper and lower oscillations cause complex pressure variations at the surface. Spatial symmetry in weather charts is described. *Subject Headings:* **Pressure waves, Extended forecasting, Symmetry points.**

2A–53 551.509.33

Evjen, Sigurd, **Über Extrapolation von ausgeglichenen Barometerwellen.** [On the extrapolation of smoothed barometer waves.] *Meteorologische Zeitschrift,* 43:209–213, June **1926.** 4 figs., ref., equation. **DWB**—Discusses extrapolation of hand-smoothed barometer curves using first and second differences and Taylor's series. A method of constructing a prognostic chart some days ahead is described. Difficult and rather subjective. *Subject Heading:* **Extended forecasting.**

2A–54 551.509.33:551.521.13

†Marvin, C. F. and Kimball, H. H., **Solar radiation and weather forecasting.** *Franklin Institute, Journal,* 202:273–306, **1926.** 23 figs., 24 refs. **DWB**—After describing various pyrheliometers, atmospheric transmission and work of Astrophysical Observatory, authors illustrate variability of

individual measurements of solar constant and errors of determination. H. H. Clayton's claims about use of solar constant in forecasting are contested, and it is considered "that the weight assignable to solar variability in the making of the weather is almost vanishingly small." *Subject Headings:* **Solar radiation, Extended forecasting.**

2A–55 551.509.33:551.543.3

Mildner, Paul, **Über Luftdruckwellen. Synoptische Darstellung der 24-tägigen und der 8-tägigen Welle für die Zeit vom 10 Dezember 1923 bis zum 19 Febr. 1924.** [On pressure waves. Synoptic exposition of the 24-day and 8-day waves for the period 10 Dec. 1923 to 19 Feb. 1924.] *Leipzig. Universität. Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 3(3):173–238, **1926.** 7 figs., 9 fold. charts, refs., equations. **DWB**—After a historical introduction on pressure waves in general, the method of applying harmonic analysis to pressure changes and the conditions which must be satisfied are set out and sources of error discussed. The 24- and 8-day waves were studied as 3rd and 9th harmonics of a 72-day interval. Charts of isophase and isoamplitude of the waves are given; the 24-day wave dominated Europe with amplitude 16.4 mb. at Spitsbergen; the 8-day wave reached 8 mb. over southern Sweden. Applications to forecasting briefly discussed. *Subject Headings:* **Harmonic analysis, Pressure waves, Extended forecasting.**

2A–56 551.509.33:551.543.3

Weickmann, L., **Luftdruckwellen über der Nordhemisphäre.** [Pressure waves over the Northern Hemisphere.] *Annalen der Hydrographie und Maritimen Meteorologie*, 54, Köppenheft:99–104, **1926.** 13 figs., 15 refs. **DWB**—A brief discussion of pressure waves and symmetry points illustrated by analyzed curves for 5 European stations Dec. 10, 1923–Feb. 20, 1924, and Northern Hemisphere charts of 24-day wave phase and amplitude in 1923–24 and 1924–25. *Subject Headings:* **Pressure waves, Symmetry points, Extended forecasting.**

2A–57 551.509.33

§Evjen, Sigurd, **Barometerschwingungen und langsichtige Prognosen.** [Barometric oscillations and long range forecasts.] *Geofysiske Publikasjoner*, 4(1):1–14, **1927.** 9 figs. In German. **DWB**—Describes a method of trend forecasting based on movements of pressure centers on charts of mean pressure over 6 days. *Subject Headings:* **Pressure anomalies, Extended forecasting.**

2A–58 551.509.33:551.543.3

Weickmann, L., **Die Ausbreitung von Luftdruckwellen über Europa.** [The spreading of pressure waves over Europe.] *Beiträge zur Geophysik*, 17:332–339, **1927.** 5 figs. **DWB**—Harmonic analysis of pressure curves for about 300 stations in Europe, West Asia and North Africa, 15.4–3.7.1925, gave, among others, a 20-day wave with max. amplitude over the North Sea and Asia. It was a standing wave, the centers showing alternate pulsation, and is probably connected with the European monsoon, and acts as an impulse in the general circulation of the atmosphere. Isophase and isoamplitude lines given. A 24-day wave over Europe was also found. *Subject Headings:* **Pressure waves, Extended forecasting.**

2A–59 551.509.33:551.543.3

Weickmann, L., **Das Wellenproblem der Atmosphäre.** [The wave problem of the atmosphere.] *Meteorologische Zeitschrift*, 44(7):241–253, July **1927.** 11 figs. **DWB**—In a brief survey of "period-hunting" and the theory of oscillations, author finds that periodicities of 2–3, 5–6, 8–9, 10–12, 20–24 days and about 1 month constantly recur. He then describes methods of harmonic analysis of 72-day interval Nov. 25, 1923–Feb. 22, 1924 and symmetry point of Jan. 15. Northern Hemisphere charts show amplitude and phase of dominant 24-day wave attributed to pulses in polar air mass. He next illustrates 36-day wave of same winter, attributed to a maritime-continental oscillation. *Subject Headings:* **Pressure waves, Symmetry points, Extended forecasting.**

2A–60 551.509.33:517.512.2

Vercelli, Francesco, **Cimanalisi e applicazioni.** [Wave analysis and applications.] *Società Italiana per il Progresso delle Scienze, Atti*, 17:322–343, **1928.** 4 figs., 2 tables, 19 refs., equations. **DLC**—Cimanalisi is derived from kima, wave. Author describes the method of periodogram analysis which he devised, and applies it to fluctuations of Lake Maggiore and daily pressures at Oslo, finding pressure waves of 2, 4, 8, 12 and 24 days, all of irregular amplitude, and breaks of phase. *Subject Headings:* **Periodicities, Pressure waves, Extended forecasting.**

2A–61 551.543.3

Haurwitz, B., **Luftdruckwellen auf Berg- und Talstationen.** [Pressure waves at mountain and valley stations.] *Beiträge zur Physik der freien Atmosphäre*, 15:271–278, **1929.** 4 tables, 14 refs.

DWB—Amplitude and phase of 14- and 36-day waves 1923–24 and 24- and 36-day waves 1924–25 are compared at neighboring high and low level stations showing systematic amplitude ratios and phase differences. *Subject Headings:* **Pressure waves, Extended forecasting.**

2A–62 551.509.33:551.524.33:551.543.3

Weickmann, L., **Die thermische Wirkung der 24tägigen polaren Druckwelle des Winters 1923/24.** [The thermal effect of the 24-day polar pressure wave of the winter 1923/24.] *Beiträge zur Physik der freien Atmosphäre*, 15:226–234, **1929.** 8 figs., 2 refs. **DWB**—A first study towards the dynamics of pressure waves. A symmetry point occurred on 21.12.1923. Charts of isallobars of the 24-day wave are compared with isallotherms, and the 24-day thermal wave is charted for the Northern Hemisphere. Opposition between pressure and temperature waves is illustrated by sections from Pacific across North Pole to Iraq. *Subject Headings:* **Pressure waves, Temperature waves, Symmetry points, Extended forecasting.**

2A–63 551.509.33

Angervo, J. M., **Über die Vorausberechnung der Wetterlage für mehrere Tage.** [On the precalculation of the weather situation for several days.] *Beiträge zur Geophysik*, 27:258–311, **1930.** 6 figs., 11 charts, 12 refs., 80 equations. German, English and French summaries p. 258–261. **DWB**—Future pressure changes are extrapolated from existing distribution and 3-hour pressure tendencies on the assumption that the general weather situation remains stable or changes slowly and regularly. If the rate of change is itself changing, e.g., when a large anticyclone is slowing down, extrapolation is based on a constant second differential. *Subject Headings:* **Pressure variations, Extended forecasting.**

2A–64 551.509.33:551.543.3

Castriota, F., **Oscillazioni bariche e punti di simmetria nel semestre freddo 1930–31.** [Oscillations of pressure and symmetry points in the cold half-year 1930–31.] *Ufficio presagi Ministerio Aeronautico, Annali*, 4:176–201, **1930. GB-MO**—Author found a persistent 19-day wave which he regards as an expression of alternate advance and withdrawal of Azores (warm) and Eurasian (Arctic) anticyclones over Europe and alternating cyclonic and anticyclonic weather between 45° and 65°N. *Subject Headings:* **Anticyclones, Pressure waves, Symmetry points, Extended forecasting.**

2A–65 551.509.33:551.543.3

Mildner, P., **Über Symmetriepunkte und ihren prognostischen Wert.** [On symmetry points and their forecasting value.] *Beiträge zur Physik der freien Atmosphäre*, 17:1–14, **1930.** 2 figs., table, 8 refs., 6 equations. **DWB**—An investigation of the value of symmetry points. The calculation of a single correlation coefficient between pressures preceding and following a symmetry day is found to be unsatisfactory and author develops a "correlation curve" for finding the degree of relationship for various intervals. A symmetry point is regarded as useful when a coefficient of at least 0.5 is found for at least a month. The great majority of symmetry points occur in the winter months. Their occurrence is traced to the dominance of one or several long waves (10–30 days) for a long time; if more than one wave is present, they all reach an extreme value at the same time. *Subject Headings:* **Symmetry points, Extended forecasting.**

2A–66 551.509.33:551.543.3

von Schubert, O., **Luftdruckwellen und Harmonische Analyse. Eine kritische Studie zur Frage der Anwendbarkeit der H.A. auf meteorologische Kurven.** [Pressure waves and harmonic analysis. A critical study of the question of the applicability of H.A. to meteorological curves.] *Beiträge zur Geophysik*, 28:293–336, **1930.** 16 figs., 5 tables, 2 refs., 2 equations. German and English summaries p. 293–294. **DWB**—Harmonic analysis of meteorological curves often gives improbable results. Author considers that pressure waves are not symmetric and a method is sought of determining individual oscillations without H.A.—this is found in "area-sums" which is based on Weickmann's symmetry points. The results of a number of analyses are shown for 1924. *Subject Headings:* **Pressure waves, Harmonic analysis, Symmetry points, Extended forecasting.**

2A–67 551.509.33:543.3

Weickmann, L., **Die dominierende Luftdruckwelle des strengen Winters 1928/29.** [The dominant pressure wave of the severe winter 1928/29.] *Zeitschrift für Geophysik*, 6:291–296, **1930.** 8 figs., 4 refs. **DWB**—During the cold winter of 1928–29, a 20-day pressure wave was particularly well-shown from 21.11.1928 to 20.1.1929, as a polar wave spreading outwards from the Barents Sea with decreasing amplitude. It dominated the pressure variations of the whole Northern Hemisphere. Symmetry points were well-shown. *Subject Headings:* **Pressure waves, Symmetry points, Extended forecasting.**

1931–1935

2A–68 551.524.33:551.543.3

Hänsch, Fritz, **Über die 24-tägige Welle des Winters 1923–24. Ihr Sitz in der freien Atmosphäre und das Verhalten der einzelnen meteorologischen Elemente.** [On the 24-day wave of the winter 1923–24. Its seat in the free atmosphere and the relation of the individual meteorological elements.] *Leipzig. Universität. Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 5(3):173–210, **1931.** 29 figs., biblio. p. 209–210 (31 items), equations. German summary p. 205–207. **DWB**—The connection of the different elements in the 24-day wave is investigated with the help of Lindenberg ascents 10.12.1923–19.2.1924. The general determination of wind periodicity from a pressure wave is examined. Isotherm and isallotherm charts of the 24-day rhythm are constructed and their interrelations studied. The harmonic constituents of the 24-day pressure and temperature waves are charted for the Northern Hemisphere. The effects of warm ocean currents and well-developed land climates stand out very clearly. A comprehensive study. *Subject Headings:* **Pressure waves, Isallobars, Temperature waves, Isallotherms, Extended forecasting.**

2A–69 551.509.33

§Lehmann, K., **Symmetriegebiete des Luftdrucks.** [Symmetry regions of pressure.] *Beiträge zur Geophysik*, 30:241–276, **1931.** 3 figs., 15 charts, 2 tables, 7 refs., 4 equations. German and English summaries p. 241. **DWB**—The quality and distribution of symmetry is examined for the whole Northern Hemisphere. The selection of the best symmetry day in different regions is based on a study of the basic pressure waves, giving remarkable constancy. Symmetry of whole synoptic charts is also examined. *Subject Headings:* **Pressure waves, Symmetry points, Extended forecasting, Northern Hemisphere.**

2A–70 551.509.33:551.543.3

Lettau, H., **Theoretische Ableitung und physikalischer Nachweis einer 36-tägigen Luftdruckwelle.** [Theoretical deduction and physical evidence of a 36-day pressure wave.] *Leipzig. Universität. Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 5(2):107–167, **1931. DWB**—The 36-day wave in winter 1923–24 showed indications of the tesseral oscillations required by Margules' theory. It is a stationary wave, a high over Russia being displaced to the Atlantic coast after 18 days. It appears as a harmonic of the year and gives rise to periodic changes of wind and temperature over Europe. *Subject Headings:* **Pressure waves, Extended forecasting, Europe.**

2A–71 551.509.33:551.543.3

Weickmann, L., **Neuere Ergebnisse aus der Theorie der Symmetriepunkte.** [New results from the theory of symmetry points.] *Beiträge zur Geophysik*, 34:244–251, **1931.** 7 figs. **DWB**—The structure and westward motion of fields of amplitude of the 24-day polar wave, are discussed. They show that it is a free oscillation of the atmosphere of Margules' type. *Subject Headings:* **Pressure waves, Extended forecasting, Symmetry points.**

2A–72 551.509.33

Frankfurt a. M., Wetterdienststelle. **Synoptische Bearbeitungen Nr. 1–5.** [Synoptic papers No. 1–5.] (1.) Oct. 1932. Mügge, R., **Die stratosphärische Steuerung während der Kälteperiode in Februar 1929.** [Stratospheric steering during the cold period of February 1929.] p. 2–8. 3 figs. (1 long fold.). (2.) Jan. 1933. Stüve, G., **Die Umgestaltung der stratosphärischen Steuerung vom 1.–8. Oktober 1932.** [The reversal of stratospheric steering from 1–8 Oct. 1932.] p. 10–12+. 6 synoptic charts (1 long fold.), ref. (3.) Feb. 1933. Christians, H., **Die stratosphärische Steuerung in dem kalten Februar 1932. Ein Beispiel eines selbständigen stratosphärischen Systems.** [Stratospheric steering in the cold Feb. 1932. An example of an independent stratospheric system.] p. 14–20. 6 figs. (incl. synoptic charts), (1 long fold.). (4.) March 1933. Baur, Franz, **Die interdiurne Veränderlichkeit des Luftdrucks als Hilfsmittel der indirekten Aerologie.** [The interdiurnal variability of pressure as an aid in indirect aerology.] p. 21–28. 20 figs. (5.) March 1934. Boeler, Wilhelm, **Zur atmosphärischen Steuerung.** [On atmospheric steering.] p. 1–28. 3 figs., fold. in chart, table, 16 refs., 4 equations. **DWB**—*Subject Headings:* **Steering, Interdiurnal pressure changes, Extended forecasting.**

2A–73 551.509.33

Evjen, Sigurd, **Zur langfristigen Wettervorhersage.** [On long range weather forecasting.] *Geofysiske Publikasjoner*, 10(3), **1933.** 14 p. 7 figs., 2 refs. In German. **DWB**—Describes 8–14 day forecasts for northern Norway of general weather type based on 14 and 27-day periodicities and isopleths of interobservational barometer changes without regard to sign (barometric unrest) during the preceding 6 days. Strong unrest is associated with the inbreak of moist WSW winds, small unrest with NNE winds (Arctic outflow). *Subject Headings:* **Pressure waves, Interdiurnal pressure changes, Extended forecasting, Norway.**

2A–74 551.577.33

†Preusche, Walter, **Über Niederschlagsperioden in den gemässigten Zonen der Erde. Eine Bestätigung der Ergebnisse Defants in der Abhandlung: Die Veränderungen in der allgemeinen Zirkulation der Atmosphäre in den gemässigten Breiten der Erde. (Wiener Sitzungsberichte, 121.I. 1912).** [On periodicities in precipitation in the temperate zones of the earth. A confirmation of Defant's results in the treatise: The changes in the general circulation of the atmosphere in the temperate latitudes of the earth.] Würzburg, Triltsch, **1934.** 72 p. 36 figs., 19 tables, 48 refs. German summary p. 56. **DWB**—Defant's periodicities of 6, 12, 17, 33 days (Argentine, Australia, 1904) and 6, 12, 24 days (North America, Europe, Japan 1909) are confirmed for 1926. A periodicity of 3.3 days is found in all regions. There is remarkably good agreement between the two hemispheres. Speed of translation agrees with that of depressions. Finally, these periodicities are compared with others previously found and their origin traced to combined maritime-continental and polar systems. *Subject Headings:* **Periodicities, Precipitation, Extended forecasting.**

2A–75 551.509.33:551.515.8

Smoliakov, P. T., **K voprosu postroeniia fiziko-sinopticheskoĭ metodiki dolgosrochnykh prognozov.** [On the question of the basis of the physical-synoptic method of long range prognosis.] *Zhurnal Geofiziki*, 4:3–39, **1934.** 13 figs., 36 refs., 35 equations. German summary p. 38–39. **DWB**—Advocates the extension of the principle of advection of heat to long range forecasting, prolonging the Norwegian synoptic method to periods of 3–5 and even 10 days. Author first outlines an "active" territory of the synoptic chart, where the various air masses play an active part in weather-making, and then investigates the different types of weather to be expected on the heat advection basis. The most probable gives the character of the weather to be expected. This has been tried for a short time at Kazan with 70–75% success. *Subject Headings:* **Advection, Air masses, Extended forecasting.**

2A–76 551.509.33:517.512.2

Egersdörfer, L., **Versuch einer harmonischen Analyse von Wetterkarten auf zeichnerischem Wege.** [Attempt at a harmonic analysis of weather charts by a graphic method.] *Annalen der Hydrographie und Maritimen Meteorologie*, 63:204–210, **1935.** **DWB**—Describes a method of harmonic analysis in which isopleths, generally charts of isobars, are added, subtracted and multiplied graphically, in order to obtain a number of harmonics over a large area in one series of operations. *Subject Headings:* **Harmonic analysis, Extended forecasting.**

2A–77 551.509.33:551.543.3

Mäde, A., **Ein Beitrag zur Symmetrieerscheinung von Luftdruckvorgängen des Winters 1928–29.** [A contribution to the symmetry phenomenon of pressure processes of the winter 1928–29.] *Berlin, Preussisches Meteorologisches Institut, Abhandlungen*, 10(6), **1935.** **GB-MO**—Author found a 20-day oscillation existing simultaneously in different parts of the world conforming to Margules' tesseral pattern. *Subject Headings:* **Pressure waves, Extended forecasting.**

2A–78 551.509.33:551.524.33:551.543.3

Pflugbeil, Werner, **Die 20tägige Welle des Winters 1928–29.** [The 20-day wave of the winter 1928–29.] Leipzig, Gebr. Gerhardt, **1935.** 77 p. 14 figs., 26 charts, 4 tables, 26 refs. German summary p. 51–52. **DWB**—The temperature and pressure fields of the winter 1928–29 are investigated as a wave process over a period of 60 days by phase and amplitude charts of a 20-day wave. The horizontal and vertical structure leads to a synthesis of meridional N–S and E–W motions; it is not a pure polar oscillation. A 120-day interval was also tried but proved too long. *Subject Headings:* **Pressure waves, Temperature waves, Extended forecasting.**

1936–1940

2A–79 551.509.33

§Baur, Franz, **Die Bedeutung der Stratosphäre für die Grosswetterlage.** [The importance of the stratosphere for the general weather situation.] *Meteorologische Zeitschrift*, 53:237–247, **1936.** 17 figs., 21 refs. **MH-BH.** Summary by Sir G. Walker in *Royal Meteorological Society, Quarterly Journal* 63(272):471–475, Oct. 1937. 17 figs. **MH-BH**—The difference between Norwegian and mid-European theories of cyclone formation reduces itself to the location of the waves (tropopause or stratosphere), but whatever the level, the important feature is the stratospheric pressure gradient. The direction of movement of areas of rising or falling pressure at the surface depends on this pressure gradient but in a complex way. Simple steering depends on gradient at 5000 gdm., but if this is small, steering may depend also on gradient at a lower level due to the tropopause temperature gradient (double steering). This applies especially to cyclones on track Vb. The stratospheric pressure distribution, which remains steady over several days, is especially important for the development of the general weather situations. The mathematical theory is briefly discussed. Charts

illustrate for three periods: movement of 24-hour isallobars, pressure at 5000 gdm., winds at 4 and 8 km. and potential difference 500–1000 mb. *Subject Headings:* **Isallobars, Steering, Stratosphere, Extended forecasting.**

2A–80 551.509.33

Baur, Franz, **A német tíznapos időprognózisoh az utolsó öt nyáron.** (Hungarian title.) **Die deutschen Zehntage-Vorhersagen in den letzten fünf Sommern.** [The German 10-day forecasts in the last five summers.] *Időjárás*, 40:181–183, **1936.** German translation p. 214–216. **DWB**—Includes percentage of successes and claims that reliability has become as great as daily forecasts. *Subjects Headings:* **Extended forecasting, Germany.**

2A–81 551.509.33

§Clayton, Henry Helm, **Long-period weather changes and methods of forecasting.** *Monthly Weather Review*, 64:359–376, Nov. **1936.** 21 figs. (incl. synoptic charts), 2 tables, refs. in text, 7 equations. Summary p. 374–376, 7 tables. **DWB**—Forecasting method: analyzing weather elements into periodicities, correlating with periodicities in solar data, and projecting these waves into the future for a network of stations. *Subject Headings:* **Pressure waves, Solar radiation, Extended forecasting.**

2A–82 551.511

Ertel, H., **Advectiv-dynamische Theorie der Luftdruckschwankungen und ihrer Periodizitäten.** [Advective-dynamic theory of pressure oscillations and their periodicities.] Berlin. *Universität. Meteorologisches Institut, Veröffentlichungen*, 1(1):1–31, **1936.** 107 equations. 25 refs. p. 29–30. **DWB**—From the hydrodynamical equations of the impulse stream an inhomogeneous partial differential equation for pressure is deduced, which shows that the space-change of the pressure field can be expressed as a forced irregular deformation, brought about by advective and dynamic processes. The solution of this equation by spherical functions permits a unified explanation of the west-east movement of pressure systems, development phases of complex depressions, harmonic periods of certain pressure waves, symmetry points and their distortion, westward-moving 36-day wave. The solution also gives a discrete permanent periodicity spectrum of pressure waves, which includes all known periodicities and others not yet discovered, but it can be shown that in consequence of various selection processes, many periodicities cannot be demonstrated. *Subject Headings:* **Pressure waves, Physics of the atmosphere, Extended forecasting.**—*Author's abstract.*

2A–83 551.509.33

Baur, Franz, **Einführung in die Grosswetterforschung.** [Introduction to general weather investigation.] *Math.-Phys. Bibliothek, Reihe I*, Bd. 88. Leipzig, Teubner, **1937.** 51 p. 12 figs., 13 tables, refs. **DWB.** 2 ed., 1942. 53 p. **DWB**—Extended forecasts are based on general weather situation (Witterung) derived from positions and types of centers of action and persistence of type. Baur's 10-day forecasts are obtained by a method of "multiple correlation." *Subject Headings:* **Weather types, Extended forecasting.**

2A–84 551.509.33

Baur, Franz, **Die Störungen der allgemeinen atmosphärischen Zirkulation in der gemässigten Zone.** [The disturbances of the general atmospheric circulation in the temperate zone.] *Meteorologische Zeitschrift*, 54(12):437–444, **1937.** 2 tables, 6 refs., 3 equations. **MH-BH**—Gives an account of author's "multiple correlation" of 5-day pressure means for forming regression equations giving pressure up to 3 and possibly 5 days ahead. *Subject Headings:* **Correlations, Atmospheric circulation, Extended forecasting.**

2A–85 551.511:551.543.3

Haurwitz, B., **The oscillations of the atmosphere.** *Beiträge zur Geophysik*, 51:195–233, **1937.** 6 figs., 9 tables, 22 refs., 59 equations. German and English summaries p. 195–199. **DWB**—An excellent account of the theory of gravitational waves in a single layer atmosphere. Two series of waves are set up, the first with a length of hours moving rapidly west; the other, measured in days, moving slowly east. The latter assumes a quasi-tesseral distribution with $n-k$ zonal nodes and k waves round the globe. A table gives the lengths for low values on n and k; higher values can be calculated from a simple expression. All these waves are possible but only those will exist in nature for which the conditions are suitable, e.g., harmonics of the year or periodicities in solar radiation. *Subject Headings:* **Physics of the atmosphere, Pressure waves, Extended forecasting.**

2A–86 551.509.33

†Pogade, G., **Die wissenschaftlichen Grundlagen der Baurschen Zehntage-Vorhersagen.** [The scientific basis of Baur's ten-day forecasts.] *Annalen der Hydrographie und Maritimen Meteorologie,*

65:257–264, **1937.** 15 refs. German summary p. 257. **DWB**—A summary of the relevant literature. *Subject Heading:* **Extended forecasting.**

2A–87 551.509.33:551.543.3

Schmiedel, Karl, **Stratosphärische Steuerung und Wellensteuerung.** [Stratospheric steering and wave steering.] *Leipzig. Universität. Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 9(1):1–102, **1937.** 44 figs., 36 refs. German summary p. 98–99. **DWB**—The phenomenon of symmetry in steering of 24-hour pressure changes is discussed. The Frankfurt school supports steering by average stratospheric distribution of mass and its disturbances, the Leipzig school by oscillations of the whole atmosphere. The basis of wave steering is symmetry, determined by harmonic analysis, especially 36, 24 and 20 day waves. Steering is examined in six different intervals, and is explained by long period oscillations, especially of 36 and 72 days, but is also strongly influenced by 24 and 20 day troposphere waves. The steered processes are almost exclusively waves of 2–4, 6 and 8 days. In this way the long and short waves are coupled. Finally, the importance of steering is shown for both extended and short range forecasting. *Subject Headings:* **Pressure waves, Steering, Extended forecasting.**

2A–88 551.509.33:551.543.3

§Model, Fritz, **Symmetriepunkt und Wetterkartensymmetrie.** [Symmetry point and weather chart symmetry.] *Leipzig. Universität. Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 11(2):83–152, **1938.** 15 figs., 6 series of charts, 25 refs. German summary p. 147–149. Addendum in *Meteorologische Zeitschrift*, 55:456–457, 1938. **MH-BH**—A full investigation of symmetry in weather charts arising from pressure waves. The theory of coupled waves (Margules and Ertel) leads to the conclusion that "equivalent symmetry" (in weather charts as a whole) is to be expected from "trivial" (local) symmetry under certain circumstances. A dominating long wave can give trivial though not weather chart symmetry, and appears as symmetry of general weather type. At maxima depressions are steered round the center while at minima they go through it. This wave steering is highly important. The series of charts illustrate the building up of symmetry around 15.1.1924. A useful glossary of terms is given on p. 150. *Subject Headings:* **Pressure waves, Steering, Symmetry points, Extended forecasting.**

2A–89 551.509.33:551.543.3

Pfau, Rolf, **Die 10tägige Luftdruckwelle im Sommer 1934 und ihre Dämpfungserscheinungen.** [The 10-day pressure wave of the summer 1934 and its damping phenomena.] *Leipzig. Universität. Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 9(3):219–270, **1938.** 19 figs., 30 charts, 3 analysis schemes, 9 tables, 9 refs., equations. German summary p. 266–267. **DWB**—After setting out Vercelli's method of periodogram analysis an example is given from a 10-day wave of variable amplitude. The advantages and disadvantages of Vercelli's method are set out. Finally, the complicated mechanism of the oscillation is discussed. *Subject Headings:* **Pressure waves, Periodogram analysis, Damping, Extended forecasting.**

2A–90 551.509.33:551.543.2

†Schmauss, A., **Synoptische Singularitäten.** [Synoptic singularities.] *Meteorologische Zeitschrift*, 55:385–403, **1938.** 11 figs., 31 refs. **MH-BH**—Author finds a number of prominent peaks and troughs and sudden jumps in 25-year means of a number of pressure gradients in western and central Europe. These tend to recur regularly in successive years. *Subject Headings:* **Singularities, Extended forecasting, Europe.**

2A–91 551.509.33:551.543.3

Stumpff, K., **Untersuchungen über die Symmetrie-Eigenschaften von Luftdruckkurven.** [Investigations of the symmetry peculiarities of pressure curves.] *Berlin. Universität. Meteorologisches Institut, Veröffentlichungen*, 3(1), **1938.** 40 p. German summary p. 39–40. **GB-MO.**
Wahl, E., **Ergebnisse einer einjährigen Symmetriepunktstatistik.** [Results of a one-year symmetry point count.] *Beiträge zur Geophysik*, 56(1):1–40, **1940.** 12 figs., 10 tables. **DWB**—Stumpff considers 60-day symmetry points sufficiently frequent in winter to be of use in long range forecasting. This work was continued by Wahl. *Subject Headings:* **Symmetry points, Extended forecasting.**

2A–92 551.509.33

Philipps, H., **Zehn Jahre Grosswetterforschung.** [Ten years' "broad-weather" investigation.] *Naturwissenschaften*, 27:825–834, **1939.** 2 figs., table, 15 refs. **DWB**—Reviews developments during 10 years at the Bad Homburg Institute. *Subject Heading:* **Extended forecasting.**

2A–93 551.509.33:551.51

Rossby, Carl-Gustav and others, **Relations between variations in the intensity of the zona circulation of the atmosphere and the displacements of the semi-permanent centers of action** *Journal of Marine Research*, 2(1):38–55, **1939.** 13 figs., 5 tables, 9 refs., 44 equations. **DWB**— The zonal index of the planetary W–E circulation is defined as the average pressure difference be tween 35° and 55°N. In winter this has a rough periodicity of 6–8 weeks. Maxima and minima ar associated with characteristic patterns in the pressure distribution, rising and falling indices with SW and NE shifts of centers of anticyclonic and cyclonic activity. Several synoptic phenomena ar interpreted through changes in vorticity in vertical air columns displaced from one latitude t another. These include: anticyclonic cellular structure found in isentropic charts over the U. S in summer; perturbations at sea level on 7- or 5-day mean pressure charts, and their movements trough of low pressure at 3 km. in winter. The relations of oscillations of zonal indices to semi permanent lows and highs are considered to have important forecasting implications. *Subject Headings:* **Zonal index, Vorticity, Atmospheric circulation, Extended forecasting.**

2A–94 551.509.33:551.543.

Wahl, E., **Eine Erweiterung des Begriffes der Symmetrie von Luftdruckkurven.** [An ex tension of the idea of symmetry of pressure curves.] *Meteorologische Zeitschrift*, 56:445–452, 1939 10+figs., table, 4 refs., 4 equations. **MH-BH**—A new form of Stumpff's criterion of symmetry i described and illustrated by charts and curves. It eliminates secular changes (regarded as linear) this enables the influence of longer and shorter waves on symmetry to be separated; as such wave differ in persistence, the application of symmetry to forecasting is improved. *Subject Headings* **Symmetry points, Extended forecasting.**

2A–95 551.509.33:551.51

§Allen, Roger A., **Statistical studies of certain characteristics of the general circulation of th Northern Hemisphere.** *Royal Meteorological Society, Quarterly Journal*, 66, Supplement: 88–101 **1940.** 14 figs. (incl. synoptic charts), ref. **DWB**—An account of the zonal index (35–55°N) pressur distributions associated with extreme values, and degree of persistence. Forecasts based on persist ence are better than guesses, especially in winter. *Subject Headings:* **Zonal index, Persistence Atmospheric circulation, Extended forecasting.**

2A–96 551.509.33:551.55

Arakawa, H., **Upper air currents and the long range weather forecasting.** *Weather and Climate* 7:444–[?], **1940.**—Unchecked. *Subject Heading:* **Extended forecasting.**

2A–97 551.509.33:551.543.

†§Oehmisch, Wilhelm, **Analyse einer 72tägigen Luftdruckwelle in den Wintern 1923/24 un 1924/25.** [Analysis of a 72-day pressure wave in the winters 1923/24 and 1924/25.] *Leipzig. Uni versität. Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 12:179–225, **1940.** 17 figs., 4 tables, 3 refs. **DWB**—A detailed investigation. The 72-day wave was well-developed in these winters wit maxima over the North Atlantic and North Pacific in high latitudes. The 72-day wave is importan for steering. It is better developed at high levels than on the ground, where it is retarded. Correla tion coefficients between sine curve and true pressure range up to 0.6. *Subject Headings:* **Pressur waves, Steering, Extended forecasting.**

2A–98 551.543.

†Pollak, L. W., **On cycles of pressure, especially in the neighbourhood of symmetry points** *Royal Meteorological Society, Quarterly Journal*, 66(287):419–437, Oct. **1940.** 3 figs., 5 tables, 3 refs., equations. **DWB.** Discussion, *ibid.*, 67(290):170–174, April 1941. 8 refs. **DWB**—Ver few meteorological periodicities have been established as real, yet symmetry points in pressur variations indicate periodicities of some persistence. An account is given of Führich's autocorrela tion method of periodogram analysis. This was applied to pressure variations, mostly in an interva of 50 days, centered on symmetry points, giving in each case only 2 or 3 sine curves. Examples ar illustrated. Most frequent lengths 4, 6, 8, 10 and 24 days; the symmetry producing power is greates for waves of 20–32 days. By analytic projection of two or three dominant cycles computed b Führich's method, forecasting for 10 to 14 days should be possible in winter. *Subject Headings* **Pressure waves, Symmetry points, Extended forecasting.**

2A–99 551.509.33:551.51

Willett, H. C., **Some remarks on the technique of preparing five-day weather-forecasts at th Massachusetts Institute of Technology.** *American Geophysical Union, Transactions* **1940,** Pt. 2 21st Annual Meeting. p. 258–261. table. **DWB**—Describes the method of formulating 5-da forecasts from general circulation index, 3 km. index, surface pressure maps and mean isentropic chart *Subject Headings:* **Atmospheric circulation, Isentropic charts, Zonal index, Extended forecasting.**

2A–100 551.509.33:551.513

Willett, H. C., Allen, R. A., Fletcher, R. and others, **Report on experiment in five-day weather forecasting.** Massachusetts Institute of Technology and Woods Hole, *Papers in Physical Oceanography and Meteorology*, 8(3), April **1940.** 94 p. 44 figs., 11 tables, append. **DWB**—Section I deals theoretically with the general circulation of the atmosphere and its zonal perturbations. In Section II a number of more or less hypothetical statistical and synoptic relationships of the zonal index (pressure difference 35–55°N) are examined, including persistence, periodicity, relations to sunspots, pressure profile shifts and various sectional indices, and relations with local temperature anomalies, centers of action and local regions or selected stations. This section ends with a discussion of conditions at 3 km. over U. S. A. and the relations of this 3 km. index to anomalies of temperature and precipitation. Most of the results were inconclusive but there were some valuable exceptions, mainly aerological. Next comes an analysis of pressure distributions, variations of flow pattern and forecasting factors in the Midwest. Section III describes 5-day forecasts made weekly by eight forecasters separately and their checking. The errors are analyzed; the result shows only a small margin of accuracy over that given by forecasting normal value, but valuable experience was gained in the method of attack. *Subject Headings:* **Atmospheric circulation, Correlations, Zonal index, Forecast verification, Extended forecasting.**

1941–1945

2A–101 551.509.33:523.74

Arctowski, Henryk, **On solar constant and atmospheric temperature changes.** *Smithsonian Miscellaneous Collections*, 101(5), **1941.** 62 p. 33 figs., 9 tables. Summary p. 60–62. **DSI**—In 1926–30 variations of solar constant and faculae agreed, with a mean period of 6½–7 days. They were followed by changes of temperature with a slight lag. Surges of pressure (baroterons) and temperature (thermoterons) are discussed including vertical variations. "Solar variation is an element of wide and complex influence." *Subject Headings:* **Pressure waves, Solar radiation, Solar faculae, Extended forecasting.**

2A–102 551.509.318

*Baur, Franz, **Häufigkeit und Aufeinanderfolge der Grundformen der Boden-Luftdruckverteilung über Westeuropa im Sommer auf Grund 55jähriger Beobachtungen (1885–1939).** [Frequency and succession of the basic types of surface pressure distribution over western Europe in summer on the basis of 55 years observations (1885–1939).] *Reichsamt für Wetterdienst, Forschungs- und Erfahrungsberichte, Reihe B*, No. 5, May **1941.** 39 p. 15 figs., 37 tables. **DWB**—Gives relative frequencies of 30 types of daily pressure distribution (illustrated), mostly defined by position of an anticyclone, by 5-day periods from June through August, with frequency on following and second following day. Also relative frequency of selected groups of types on each day. *Subject Headings:* **Weather types, Extended forecasting.**

2A–103 551.509.33:551.543.3

†§Lay, Walter, **Synoptische Luftdrucksingularitäten.** [Synoptic pressure singularities.] *Reichsamt für Wetterdienst, Forschungs- und Erfahrungsberichte, Reihe B*, No. 4, **1941.** 73 synoptic charts, 80 refs. **DWB**—Reproduces mean pressure charts for every 5-day period 1890–1909, with explanations of the meteorological processes involved. The "singularities" in these lead to a method of "synoptic extrapolation." *Subject Headings:* **Singularities, Extended forecasting.**

2A–104 551.509.33

Rossby, Carl-Gustav, **Comments on the Weather Bureau's experiment in five-day weather forecasting.** (Summary.) *American Geophysical Union, Transactions*, **1941,** Pt. 2, 22nd Annual Meeting, p. 437–437b. **DWB**—An account of the experiment from the summer of 1936. Considerable progress has been made with the description and interpretation of circulation patterns, long waves in the westerlies, etc. *Subject Headings:* **Atmospheric circulation, Extended forecasting.**

2A–105 551.509.33:551.513

†§Rossby, Carl-Gustav, **The scientific basis of modern meteorology.** (In **Climate and Man, Yearbook of Agriculture,** U. S. Dept. of Agriculture, **1941.** p. 599–655. 38 figs., 24 refs.) **MH-BH**—Following an account of pressure systems and the general circulation, p. 641–654 deal with applications to long range forecasting. A clear, well-illustrated account of the development of a 5-day forecast chart and its verification is given. The paper includes sections on convective circulation, meridional circulation, influence of earth's rotation, planetary flow patterns, circulation patterns, polar front waves and a historical note. *Subject Headings:* **Atmospheric circulation, Extended forecasting.**

2A–106 551.509.33 551.543

Stumpff, Karl, **Realität und Singularitäten der 24tägigen Luftdruckwelle.** [Reality and singularities of the 24-day pressure wave.] *Meteorologische Zeitschrift*, 58:117–127, **1941.** 6 figs., 5 tables. German summary p. 117. **DLC**—An investigation of the 24-day wave was made for 27 European stations for 1922–30. It showed that this wave was especially active in the first 6 years and that it often persisted for a year. This persistence was broken by singularities, always in late winter. It is shown that at a Norwegian station in the center of activity of this wave, the Schuster criterion shows its existence to be probably real. Between the singular points in the different intervals of time the wave is always of the same type. Charts of phase and amplitude of the 24-day wave are given. *Subject Headings:* **Pressure waves, Symmetry points, Extended forecasting, Europe.**

2A–107 551.509.33

Willett, H. C., **Report of the five-day forecasting procedure, verification and research as conducted between July 1940 and August 1941.** Contributions: Allen, R. A. and Namias, J. Cambridge, Mass., Massachusetts Institute of Technology and Woods Hole, *Papers in Physical Oceanography and Meteorology*, 9(1), **1941.** 88 p. 19 figs., 10 tables, 7 refs. **DWB**—Section I of this interim report describes the setup. Section II describes the routine of preparing and verifying 5-day forecasts. Section III, special investigations include: statistical analysis of Polar Year data; polar anticyclongenesis and the zonal index; the meridional transport of water vapor; maps of the upper troposphere; movements of upper level wave system; precipitation pattern correlated with mean maps; ocean weather forecasts; charts of visibility, ceiling and cloudiness. Suggestions for additional research are given in section IV, and include proposals for extending the forecasts to longer periods and wider areas. Subsequent reports were published annually under the heading: Final report of the Weather Bureau—M.I.T. extended forecasting project for the fiscal year. These deal mainly with the work done on variations of the general circulation expressed by various indices, etc. The report for 1948–1949 includes a survey of theories of climatic change. *Subject Headings:* **Anticyclones, Atmospheric circulation, Correlations, Zonal index, Extended forecasting.**

2A–108 551.509.33

Willett, H. C. and Scofield, E. L., **The progress of research leading to the improvement of the present methods of extended weather forecasting and the development of new methods.** Massachusetts Institute of Technology, **1941.** 55 leaves. 10 tables, 9 equations. (Typescript.) **DWB**—Section I deals with the tabulation, averaging, plotting and statistical analysis of Northern Hemisphere pressure data for October 1, 1937 to March 31, 1938; section II contains a statistical analysis of monthly and seasonal precipitation data; section III lists suggestions for investigations in extended forecasting. *Subject Heading:* **Extended forecasting.**—*I. L. D.*

2A–109 551.509.33:551.509.318

Blewett, Stephen E. and Paulhus, Joseph L. H., **Report on six-day weather types of North America.** California Institute of Technology, **1942.** 24 p. 10 figs., 13 refs., 8 equations. **DWB**—*Subject Headings:* **Weather types, Extended forecasting, North America.**

2A–110 551.509.33

Elliott, Robert D., **Studies of persistent regularities in weather phenomena.** California Institute of Technology, Feb. **1942.** 16 p. 10 figs. **DWB**—Empirically discovered regularities in intervals between various weather phenomena are related to regularities in atmospheric circulation apparently due to the upper air. They are attributed to the natural oscillations of the atmosphere. "By the mechanical use of certain observed regularities of periods it is possible to make moderately successful long range forecasts, but much more accurate forecasts are possible when the further refinement of weather type analysis is introduced." *Subject Headings:* **Weather types, Singularities, Extended forecasting.**

2A–111 551.509.33:551.543.3

Frolow, S., **Sur des variations simultanées de la pression dans la région tropicale.** [On simultaneous variations of pressure in the tropical region.] Martinique, Service Météorologique, **1941.** 13 p. 5 figs., 6 tables. (Mimeographed.) **DWB. On synchronous variations of pressure in tropical regions.** (Translation: *American Meteorological Society, Bulletin*, 23:239–254, June 1942, 5 figs., 6 tables.) **DWB**—From about 30 barometer records in Central America–West Indies–West Africa, author finds that 70–80% of 72-hour variations are similar to those at Fort-de-France, due to a widespread synchronous periodicity of 6 days. *Subject Headings:* **Pressure waves, Extended forecasting, Central America, West Africa, West Indies.**

2A–112 551.509.33

Krick, Irving P., **A dynamical theory of the atmospheric circulation and its use in weather forecasting.** California Institute of Technology, Feb. **1942.** 43 p. 22 figs., biblio. p. 41–43. **DWB**—The constant angular velocity of the upper west winds is attributed to a dynamically stable solenoidal field maintained primarily by absorption of solar radiation by ozone. Perturbations are attributed to the "polar front solenoidal field" off the Asiatic coast (Asiatic jet) resulting in eastward moving pressure waves which set up wave cyclones on the polar front in favorable conditions. Irregularities in weather conditions at the earth's surface are due to changing weather types and interaction of thermally different air masses, complicated by changing seasons and the distribution of land and sea. Numerous charts but reproduction poor. *Subject Headings:* **Atmospheric circulation, Ozone, Polar fronts, Extended forecasting.**

2A–113 551.509.33:551.543.3

Stumpff, Karl, **Periodicity and symmetry in the course of atmosphere pressure and their importance for weather forecasting.** *American Meteorological Society, Bulletin,* 23(3):105–110, March **1942.** 3 figs., refs. **MH-BH**—From "Research and Progress," 5(2):87–94, 1939. Deals mainly with properties of symmetry points arising from pressure waves. *Subject Headings:* **Pressure waves, Symmetry points, Extended forecasting.**

2A–114 551.509.33:517.512.2

Wagemann, H., **Der erweiterte harmonische Analysator nach Mader-Ott und seine Verwendung in der synoptischen Meteorologie.** [The extended harmonic Mader-Ott analyzer and its application in synoptic meteorology.] *Meteorologische Zeitschrift,* 59:134–137, **1942.** 2 figs. German summary p. 134. **DLC**—A modified form of the Mader-Ott analyzer is described and illustrated, which gives sine and cosine terms with one tracing of the curve. Several can be connected to give up to 4 harmonic components with one tracing. Author considers that harmonic analysis can convert distribution in space into a mathematical form suitable as a basis for forecasting, but should not be used in the analysis and extrapolation of time series. *Subject Headings:* **Harmonic analysis, Extended forecasting.**

2A–115 551.509.33:551.513.1

Wexler, Harry, **Use of Rossby's trough formula on the mean 5-day 3-km. pressure charts.** *American Meteorological Society, Bulletin,* 23(1):32–34, Jan. **1942.** tables, 2 refs. **MH-BH**—Rossby's formula $c = U - \beta L^2/4\pi^2$ assumes horizontal motion. Measurements of L (wave length) and U (west-east air speed), are discussed. Changes of L are important in forecasting; the formula does not give deepening and filling of troughs. *Subject Headings:* **Atmospheric circulation, Extended forecasting.**

2A–116 551.509.33

§Aime, Edgar A. and Johnson, Ernest C., **Methods for the preparation of six-day forecasts.** U. S. Weather Bureau, Extrapolation Forecast Section, Nov. **1943.** 26 p. 19 figs., table. **DWB**—Describes preparation of daily prognostic charts for 6 days ahead based on large scale distribution of cold and warm air and their meridional interactions, through isobaric patterns at 3 and 6 km. Fully illustrated by charts. *Subject Headings:* **Atmospheric circulation, Extended forecasting.**

2A–117 551.509.33

Clapp, Philip F., **Improvement of trend methods of forecasting.** *U. S. Weather Bureau, Research Paper,* No. 5, **1943.** 6 p. 2 tables. (Mimeographed.) **DWB**—The method involves extrapolating pressure graphs at intersections of latitudes and longitudes. Methods based on multiple regression between mean P and values P1, P2 and P3 were explored but without much success. *Subject Headings:* **Pressure trends, Correlations, Extended forecasting.**

2A–118 551.509.33

†§Namias, Jerome, **Methods of extended forecasting; practiced by the five-day forecast section.** U. S. Weather Bureau, Sept. **1943.** 65 p. 50 figs., 26 refs. **DWB**—Describes work on zonal indices, fundamental forecasting of 10,000 ft. mean chart and resulting forecast of surface pressures from this and forecast of temperature of intermediate layer. Slowing down of local zonal circulation over Europe in various ways is considered. Post-mortems are an important part of the technique. *Subject Headings:* **Atmospheric circulation, Extended forecasting.**

2A–119 551.509.33

Page, Larry F., **Report on critical studies of methods of long-range weather forecasting.** Also **Report on five-day weather forecasting practice.** Massachusetts Institute of Technology, **1943. GB-MO**—Unchecked. *Subject Heading:* **Extended forecasting.**

2A–120 551.509.33:551.5

§*Stone, E. S. and Willett, H. C., **A statistical analysis of certain problems of extended weathe forecasting.** Massachusetts Institute of Technology, **1943,** (1944). 61+p. 16 p. of fold. tables and 35 Northern Hemisphere charts. (Mimeographed.) **DWB**—Section I summarizes work done in preparing basic charts and profiles and computing circulation indices. Section II describes statistical investigations involving circulation indices and pressure profiles, including correlation coefficients; relationships between departures from normal at 20°, 45° and 60°N and Quadrant pressure profiles and different types of zonal westerly index; interrelations between various branches of the general atmospheric circulation (meridional, zonal, quadrant, surface, 3 km.); relations between weekly pressure changes in various latitudes and various indices. Section III investigates 5-day mean pressure charts and weekly pressure change charts. Section IV outlines suggestions for further research on 5-day means. Tables give 5-day values of the various indices from Oct. 1, 1932 to March 29, 1933 and Oct. 2, 1935 to March 29, 1936, numerous correlation coefficients and regression equations with lags up to 50 days. Charts represent average 5-day M.S.L. pressures and pressure changes at and preceding different zonal indices. *Subject Headings:* **Atmospheric circulation, Correlations, Zonal index, Extended forecasting.**

2A–121 551.509.33:551.543.3

Vercelli, Francesco, **Periodicita e previsioni barometriche.** [Periodicity and barometric forecasts.] *Rivista di Meteorologia Aeronautica,* 7:91–100, July **1943.** 4 figs. **DWB**—Describes an experiment of analyzing curves of daily barometric values into sine curves of variable amplitude, the difficulties met with in recognizing exact lengths of waves and the systematic errors involved. Some trial forecasts of isobaric curves and charts of Europe several days ahead are considered moderately successful. *Subject Headings:* **Pressure waves, Extended forecasting.**

2A–122 551.509.33

Baur, Franz, **Zur Methode der "ähnlichen Fälle."** [On the method of "similar cases."] *Meteorologische Zeitschrift,* 61(1):28–31, Jan. **1944.** fig. **MH-BH**—A "similar case" is one in which the daily pressure distributions over a large area (e.g., Greenland–Azores–Ankara–Pechora Bay) are similar over a number of successive days. Only about 30 series of 7 or more days a year can be paralleled with similar series in earlier years and, as at least four days are required to demonstrate a similar sequence, only very rarely can extended forecasts be made in this way. *Subject Headings:* **Analogues, Extended forecasting.**

2A–123 551.509.33:551.513:532.59

Clapp, Philip F., **Empirical studies of the motion of long waves in the westerlies.** *U. S. Weathe Bureau, Research Paper,* No. 20, **1944.** 33 p. 5 figs. (in back), 9 tables, 13 refs. (Typewritten. **DWB**—Author finds a definite correlation (about 0.5) between the displacement and wave length c long waves as indicated by Rossby's formula, and also a systematic variation of velocity with time These agree quantitatively with a theoretical formula for the displacement based on Rossby's. *Subject Headings:* **Atmospheric circulation, Correlations, Extended forecasting.**

2A–124 551.509.33:551.577

Frolow, Nikita, **Sur la prévision des époques pluvieuses.** [On forecasting rainy periods.] *Académie des Sciences, Paris, Comptes-Rendus,* 219:459–461, **1944.** fig. **DWB**—Author applied Labrouste's periodogram to intervals between raindays and by extrapolating resultant curves was able to forecast rain up to 20 days ahead. *Subject Headings:* **Periodicities, Extended forecasting.**

2A–125 551.509.33:551.509.317

Gentry, R. C. and Weiss, L. L., **Prognostic maps for 20,000′.** U. S. Weather Bureau, Special Forecast Section Research Unit, **1944.** 13 p. 31 figs. (Typescript.) **DWB**—A regression formula is developed for forecasting pressures at 20,000 ft. for 3 to 7 days in advance, from change of pressure in preceding 3 to 7 days and departure from normal on forecast day. Charts are divided into 6 types and empirical rules given to improve on this formula. *Subject Headings:* **Upper air pressure, Correlations, Extended forecasting.**

2A–126 551.509.33

§Namias, Jerome and Clapp, Philip F., **Studies of the motion and development of long waves in the westerlies.** *Journal of Meteorology,* 1(3–4):57–77, Dec. **1944.** 15 figs., 11 tables, 14 refs., 13 equations. **MH-BH**—Gives 5-day mean Northern Hemisphere charts of pressure at M.S.L. and 10,000 ft. The long waves in the westerlies agree quantitatively with Rossby's theoretical formula. Examples are shown of complex troughs and ridges brought about by different speeds of motion in different latitudes. Indications of development of new troughs and cases of blocking are discussed and Rossby's formula for trough displacement is verified, but displacements are modified by con-

ergence and divergence. A systematic decrease with time in speed of troughs is found. Practical use of empirical displacement formulas discussed. *Subject Headings:* **Atmospheric circulation, Upper air pressure, Extended forecasting.**

2A–127 551.509.33:551.501.7

U. S. Air Weather Service, **Forecasting by statistical and synoptic extrapolation.** *Report*, No. 730, **1944.** 318 p. **GB-MO**—Characteristics of surface pressure distribution are reflected in the iso-height lines of the 500 mb. level. A prediction formula is prepared for each of 30–40 stations giving a linear relation between "forecast" height of 500 mb. level and present and previous heights. Some account is taken of trends and isallobars, of temperatures at 200 mb. and thickness layers. In this way forecast 500 mb. charts are drawn 1, 2 and 3 days ahead and the forecast surface charts are derived from these. *Subject Headings:* **Upper air pressure, Extended forecasting.**

2A–128 551.509.33

§U. S. Weather Bureau, **A collection of reports on extended forecasting research** [*Research Papers*, No. 2, 3, 4, 7, 8, 9, 10, 11]. January **1944. DWB**—[2] Norton, Horace W., Brier, Glenn W. and Allen, Roger A., **A project to test the potential usefulness of pressure patterns for forecasting.** p. 1–15. 15 figs. (incl. synoptic charts), 2 tables. Tests of the accuracy of forecasts of 5-day temperature and precipitation anomalies: (1) given a perfect forecast of the mean pressure pattern (M.S.L. and 3 km. charts and zonal indices); (2) given a series of daily charts preceding the forecast period. Scores (analyzed in detail) were low and show that about half the errors of forecasts are made after completion of prognostic pressure maps. Reasons discussed.

[3] Weiss, Leonard L., **Preliminary report on duration of stormy periods at selected localities and intervals between periods.** p. 16–25. 5 plates, 3 tables, 4 refs., equations. An examination of the tendency for stormy periods to recur at quasi-regular intervals. Frequency distribution of daily sequences in 4 areas resembles that due to chance.

[4] Johnson, C. B., **Some relationships between five-day mean surface maps and their component daily maps.** p. 26–38. 10 figs. (incl. synoptic charts), 6 tables, 2 refs.

[7] Gentry, Robert C., **Formation of new moving centers south of deep lows.** (Preliminary report.) p. 39–49. 9 figs., 3 refs. Cases of development of new centers where dominating influence was a deep low to the north are classified into 4 types and conditions of formation tabulated.

[8] Dorsey, Herbert G., Jr. and Brier, Glenn W., **An investigation of a trajectory method for forecasting flow patterns at the 10,000-foot level.** p. 50–58. 11 tables, ref., 2 equations. One hundred and seventy-one forecasts were based on Rossby's extension of the harmonic wave formula to irregular flow patterns (for method see Starr, V. P., **Basic principles of weather forecasting,** 1942. p. 274). These were checked statistically for wind direction and speed and position in flow pattern. Suggestions are made for extrapolating trajectories to 5 days.

[9] Gentry, Robert C. and Weiss, Leonard L., **Preliminary report on stagnant highs over Greenland, Iceland and England and over the Bering Sea and Alaska, in July and August.** p. 59–62. chart, table, ref.

[10] Norton, H. W. and Brier, G. W., **Persistence in London temperatures.** p. 63–69. 10 tables, equations. Correlations of mean monthly temperatures in London 1764–1863 with each of 12 subsequent months. Largest for summer months irrespective of lag. The 144 coefficients are analyzed statistically but are not of great value for reducing the error of a forecast.

[11] Brier, Glenn W., **Skill in selecting the "best" forecast.** p. 70–71. 2 tables. A statistical method of testing selection of best of three forecasts. *Subject Headings:* **Atmospheric circulation, Correlations, Forecast verification, Temperature, Extended forecasting, Greenland, Iceland, London, England, Bering Sea, Alaska.**

2A–129 551.509.33:551.510.535

Abbot, Charles Greeley, **Correlations of solar variation with Washington weather.** *Smithsonian Miscellaneous Collections*, 104(13), **1945.** Also *American Geophysical Union, Transactions*, 26(3):367–373, Dec. 1945. 5 figs., 2 tables. Discussion by J. B. Kincer, *ibid.*, p. 373–378. fig., 3 tables. **DWB**—Compares daily measurements of critical frequency f°E in ionization layer E with temperatures in Washington and finds very close agreement with similar curves for different years of comparison with solar radiation, 7 days before to 19 days after. It is considered that approximate predictions of Washington temperature a week in advance could be made if daily reports of f°E were available from sufficient stations and if date of next solar change could be predicted a few days ahead. *Subject Headings:* **Ionosphere, Solar radiation, Temperature, Extended forecasting, Washington, D. C.**

2A–130 551.509.33

Clapp, Philip F., **Some problems associated with the stability of the westerlies.** *American Geophysical Union, Transactions*, 26(1):37–44, Aug. **1945.** 4 figs., 10 refs., 19 equations. **DWB**—

A mathematical study of deepening and filling of waves in westerlies shown by 5-day high level pressure charts. It is confined to horizontal motion so that energy is derived from kinetic energy of westerlies, which is only transformed into cyclonic vortices in extreme cases. *Subject Headings:* **Atmospheric circulation, Upper air pressure, Extended forecasting.**

2A–131 551.509.33:551.515.7

§Namias, Jerome, **Investigation of polar anticyclogenesis and associated variations of the zonal index.** *U. S. Weather Bureau, Research Paper,* No. 24, **1945.** 22 p. 15 figs., 3 tables, 11 refs. (Photo offset.) **DWB**—A strong polar high in latter half of Feb. 1941 is investigated in detail by 5-day mean surface pressure maps and isallobars. The Aleutian low split into two and the Siberian anticyclone crossed the polar regions. Relations to Asiatic zonal index are illustrated, including path of tropopause crest and pressure crest. Zonal index correlations quoted. *Subject Headings:* **Anticyclones, Zonal index, Extended forecasting.**

2A–132 551.509.33

Namias, Jerome (Chairman), **Report of the Committee on Extended Forecasting 1944–1945.** *American Geophysical Union, Transactions,* 26(3):445, Dec. **1945. DWB**—It was decided that the Committee would prepare an up-to-date bibliography on long range forecasting from reports and papers printed during the past 5 years, and later one of earlier literature. A chapter summarizing methods of long range forecasting is also to be written. *Subject Headings:* **Extended forecasting, Progress in meteorology.**

1946

2A–133 551.509.33:523.74

Clayton, H. H., **Sunspot changes and weather changes.** *Smithsonian Miscellaneous Collections,* 104(19), **1946.** 29 p. 22 figs., 10 tables, 8 refs. **DWB**—Gives curves and tables showing sunspot numbers preceding and following daily changes of temperature at various stations, origin and changes of anticyclones and cyclones in North America, and monthly and annual changes of pressure in sunspot cycle. Research complicated by terrestrial factors. *Subject Headings:* **Sunspots, Extended forecasting.**

2A–134 551.509.33

Mackey, G. W. and Dale, P. T., **Zonal indices—Notes on their use in Tasmania.** *Australian Meteorological Bureau, Weather Development and Research Bulletin,* 6:15–20, **1946.** fold. chart, table. **DWB**—Daily and 5-day zonal indices were calculated south of anticyclone track across Australia Aug. 1945–March 1946. Authors conclude that daily zonal index may be of great value and can probably be forecast for 3–4 days but further analysis is required. No useful results were obtained from 5-day means. *Subject Headings:* **Zonal index, Extended forecasting, Australia.**

2A–135 551.509.33(52)

Takahashi, K., **Long range forecasting based on the periodicity of meteorological phenomena.** *Meteorological Society of Japan, Journal,* 2nd Ser., 24:12–20, **1946.** 4 figs., 6 tables. In Japanese, English summary p. 35. **DWB**—A given weather type in Japan persists for at least a month. There is a stable periodicity of 4 days in pressure; longer periodicities diminish progressively in length and amplitude, but the same type continues for 10–15 days. Extended forecasts can be based on these periodicities. *Subject Headings:* **Pressure waves, Weather types, Japan.**

2A–136 551.509.33:551.526.8

Tóth, Géza, **A dunai jégképzödés elörejelzése.** [Forecasting ice conditions on the Danube.] *Időjárás,* 50:84–85, Dec. **1946.** English summary p. 111. **DWB**—Successful forecasts a week ahead were based on: ice drift on Danube near Budapest begins when accumulated temperature of successive days reaches −15°C. When sum amounts to −40°C. Danube will be frozen in. *Subject Headings:* **Accumulated temperatures, River ice, Extended forecasting, Danube.**

2A–137 551.509.33:551.543.3

Walker, Sir Gilbert, **On periods and symmetry points in pressure as aids to forecasting.** *Royal Meteorological Society, Quarterly Journal,* 72(314):265–278, Oct. **1946.** 7 figs., 3 tables, 8 refs., 6 equations. Discussion p. 279–283. **MH-BH**—Author argues that effect of persistence ("coherence") in pressure series produces an appreciable amount of apparent periodicity, which differs little from that found in a random series incorporating a persistence term. If a wave system appears there is no ground for expecting it to continue so as to justify a forecast. Such random series also produce as much symmetry as is found in pressure series. Hence neither waves nor symmetry points are of use in long range forecasting. In the discussion C. E. P. Brooks showed that observed pressure waves agree with those required by theory and produced some evidence that waves are

started by variations of solar radiation and break down when they get out of step with these. *Subject Headings:* **Pressure waves, Symmetry points, Extended forecasting.**

1947

2A–138 551.509.33:551.521.13

Abbot, Charles Greeley, **The sun's short regular variation and its large effect on terrestrial temperatures.** *Smithsonian Miscellaneous Collections*, 107(4), **1947.** 33 p. 12 figs., 2 refs., 9 tables. **DWB**—*Subject Headings:* **Extended forecasting, Solar radiation.**

2A–139 551.509.33:551.577

Klein, William H., **Recommended procedure in preparing forecast of five-day winter precipitation anomaly in the Tennessee Valley from the mean 700 mb. prognostic map.** U. S. Weather Bureau, Extended Forecast Section **1947.** *Idem.*, **An objective method of forecasting five-day precipitation for the Tennessee Valley.** *U. S. Weather Bureau, Research Paper*, No. 29, 1949. 60 p. 17 figs., 14 tables, 37 refs., 16 equations, append. **DWB**—The forecasts of the mean zonal 700 mb. circulation were successfully applied to forecasting the 5-day rainfall in Tennessee Valley but have a wider application. Parameters used are: air trajectory, prevailing storm path, local precipitation index, measures of convergence, distance from trough or ridge. Forecasting graphs are given. *Subject Headings:* **Atmospheric circulation, Precipitation forecasting, Extended forecasting, Tennessee Valley.**

2A–140 551.509.33

†§Namias, Jerome, **Extended forecasting by mean circulation methods.** U. S. Weather Bureau, **1947.** 89 p. 74 figs. (incl. synoptic charts), 3 tables, refs., 9 equations. **DWB**—A revision and extension of "Methods of extended forecasting" published by the Weather Bureau Sept. 1943. Summary of principles and practice of 5-day forecasts in the Weather Bureau. After describing and illustrating the model circulation and that observed at M.S.L. and 700 mb., the various indices obtained from zonal pressure means are listed. Long waves in the westerlies and the relation of the pressure distribution to high and low zonal indices lead to the conclusion that correct index forecasting is a necessary foundation. Methods of forecasting indices are discussed, and from them of forecasting the mean 700 mb. charts by considerations of wave length, constant absolute vorticity, deepening and filling of troughs, trend and kinematical methods. After this comes forecasting the 5-day mean M.S.L. pressure map and isentropic charts. From statistical data probable limits of weather associated with mean charts can be stated. The preparation of prognostic daily charts is illustrated and an example of a successful 5-day forecast set out. *Subject Headings:* **Atmospheric circulation, Zonal index, Extended forecasting.**

1948

2A–141 551.509.33:551.543.3

Dinies, R., **Über die Verwendung langjähriger Luftdruckmittel für die Vorhersage.** [On the application of long period pressure means to forecasting.] *Wetter und Klima*, 1(1–2):21–27, Jan.–Feb. **1948.** fig. **DWB**—Von Elsner's 20-year 5-day pressure means for a number of stations were plotted and 5-day means for the current year superposed. These served as a basis for pressure forecasts for next 5 days. Three years' results gave a positive correlation exceeding 0.7 in central Germany but small over Atlantic. *Subject Headings:* **Singularities, Extended forecasting.**

2A–142 551.509.33

Hofmann, Alfred, **Methoden der mittelfristigen Witterungsvorhersage.** [Methods of medium-range weather forecasting.] *Meteorologische Rundschau*, 1:233–237, **1948.** 5 figs. **DWB**—Briefly summarizes medium range forecasting methods by (1) analogues (similarity of synoptic situation and development); (2) correlation (Baur's multiple correlation); (3) rhythms and symmetry points. Author states that even a well-developed periodicity in pressure can only be extrapolated for a half wave length. In these ways forecasts up to 7 days are possible; spring and autumn are the most difficult seasons. *Subject Headings:* **Analogues, Correlations, Symmetry points, Extended forecasting.**

2A–143 551.509.33:551.515.7

§Johnson, Charles B., **Anticyclogenesis in eastern Canada during spring.** *American Meteorological Society, Bulletin*, 29(2):47–55, **1948.** 5 figs., 2 tables, 10 refs., append. **MH-BH**—The general circulation over North America during periods of anticyclogenesis in eastern Canada in spring is studied by 5-day mean pressure charts; charts of average pressure at M.S.L. and 10,000 ft. during 19 such periods are compared with normal. Air particle trajectory computations suggest that the development of a characteristic warm upper level ridge in East Canada is related to the trough and area of convergence in western U. S. A. *Subject Headings:* **Anticyclones, Upper air pressure, Extended forecasting.**

2A–144 551.509.33(02)

§Pack, S. W. C., **Weather forecasting.** London, Longmans, Green, [1948]. 192 p. 26+figs., 3 tables, 2 append. **DWB**—Chap. 27 "Long range forecasting," p. 170–173, describes briefly 5-day forecasts in U. S. A. and long range forecasting by zonal index, movements of anticyclones and analogues (Krick). *Subject Headings:* **Extended forecasting, Textbooks.**

2A–145 551.543.3

Radok, Uwe, **A note on the statistical significance of symmetry points, with special reference to Melbourne pressure.** *Royal Meteorological Society, Quarterly Journal*, 74(320):196–199, April **1948.** 3 figs., 2 tables, 5 refs. **DWB**—Points out that Stumpff's symmetry index k_{2n} is the same as Fisher's "intraclass correlation" for which an exact sampling distribution is known. From 9h. pressures at Melbourne 1941–44, frequency of symmetry points was calculated and was found to agree closely with that expected by chance. Persistence of symmetry was also tested and was found to be absent. Author infers that symmetry is useless for forecasting. Reply by J. Wadsworth: **Symmetry points,** *ibid.*, 74(321–322):407–409, July–Oct. 1948. 4 refs. Maintains value of symmetry points. *Subject Heading:* **Symmetry points.**

2A–146 551.509.33:551.543.3

Yazawa, Y., **Study of the symmetry characters found on the pressure curves and application of its results to long-range forecasting.** *Meteorological Society of Japan, Journal*, 2nd Ser., 26:227–232, **1948.** In Japanese, English summary p. (25). 3 figs. **MH-BH**—Application of symmetry index to pressure at Tokyo Oct. 1928 to March 1929 gave high indices. Results of forecasts favorable if prediction is corrected for trend. *Subject Headings:* **Symmetry points, Extended forecasting.**

1949

2A–147 551.509.33:551.509.317:551.524.3

Martin, Donald E. and Leight, Walter G., **Objective temperature estimates from mean circulation patterns.** *Monthly Weather Review*, 77:275–283, Oct. **1949.** 17 figs., 2 tables, 7 refs. **DWB**—Surface temperature anomalies are deduced from monthly mean circulation patterns produced by Weather Bureau Forecast Section, by graphical correlation, from curvature of isobars, pressure departure and air trajectories on 5-day or monthly mean 10,000 ft. or 700 mb. charts. *Subject Headings:* **Atmospheric circulation, Temperature anomalies, Extended forecasting.**

2A–148 551.509.33:551.543

Ramamurti, K. S., **Long-term longitudinal oscillation of the atmosphere in the vicinity of South America.** *Journal of Meteorology*, 6(1):63–65, April **1949.** fig., 5 tables, 10 refs., 7 equations. **DWB**—An equation involving mean pressure and latitude is fitted to departures of pressure at stations in South America, the parameters of which represent advection of air, changes of meridional circulation and displacement, expansion or contraction of trade wind cell. *Subject Headings:* **Atmospheric circulation, Extended forecasting, South America.**

1950

2A–149 551.509.33

Dufour, L., **Sur quelques résultats obtenus dans le domaine de la prévision à longue échéance.** [On some results obtained in the domain of long range forecasting.] *Belgium, Institut Royal Météorologique, Miscellanées*, Fasc. 39, **1950.** 28 p. 9 figs., 39 refs. **GB-MO**—A favorable account of the work of the Extended Forecast Section of the U. S. Weather Bureau, where the author worked for several months. *Subject Headings:* **Extended forecasting, United States.**

2A–150 551.509.33

Serra, Adalberto B., **A graphical method of forecasting.** Rio de Janeiro, **1950.** 3 p. fig. (Duplicated.) **GB-MO**—Describes a method of graphical extrapolation of curves, which author claims will help "extended forecasting." *Subject Heading:* **Extended forecasting.**

SUPPLEMENTARY MATERIAL

(*Came to our attention too late for inclusion in proper order*)

2A–151 551.509.33:551.543.3

Weickmann, L., **Wellen im Luftmeer. Neuere Untersuchungen über Gesetzmässigkeiten im Gange und in der Verteilung des Luftdruckes. 1. Mitt. Symmetriepunkte des Luftdruckganges, der Luftdruck als zusammengesetzte Schwingung.** [Waves in the atmosphere. •New investigations

on regularities in the variation and distribution of atmospheric pressure. Pt. 1. Symmetry points in the variation of pressure as a composite oscillation.] *Saxony, Sächsische Akademie der Wissenschaften, Abhandlungen*, 39(2), **1924.** 46 p. 5 plates. Published separately by S. Hirzel, Leipzig. **GB-MO**—Author defines simple and double symmetry in a curve formed by superposing two sine curves, and examines the symmetry points of June 10 and Dec. 30, 1922. The seasonal variation of length of waves, due to variation in troposphere temperature, can be allowed for by changing the linear scale. Several examples of harmonic analysis of intervals up to 180 days are given, the chief waves found being 22, 11, 8 and perhaps 6 days. Finally, he considers the transition to the spatial distribution of pressure, and gives a set of maps on either side of the S.P. of Nov. 6, 1923. *Subject Headings:* **Extended forecasting, Pressure variations, Symmetry points, Harmonic analysis.**

2A–152 551.509.317:551.513:551.547

Namias, Jerome, **Evolution of monthly mean circulation and weather patterns.** *American Geophysical Union, Transactions*, 29(6):777–788, Dec. **1948.** 11 figs., 11 refs. **DWB**—As a result of six years experiment in preparation of monthly mean forecasts from charts of air flow in the mid troposphere, the author concludes that the monthly temperature and precipitation anomalies over wide areas are determined by variations in monthly mean pressure (and hence air flow), and that these flow patterns undergo a gradual and orderly development. A large number of actual mean pressure and anomaly charts of temperature and precipitation are presented, along with schematic diagrams, to support the author's contention that these anomalies are based on well-known physical or dynamic processes. (Same item as No. 2–51 in Feb. 1950 *Meteorological Abstracts*.) *Subject Headings:* **Extended forecasting, Atmospheric circulation.**—*M.R.*

2A–153 551.509.33

U. S. Weather Bureau, **Average monthly weather resume and outlook.** Washington, D. C., Supt. of Documents. $4.80 per year. (Back issues not available.) First number issued March 1947. Vol. 5, No. 5, March 3, 1951 latest issue received. 4 p. 8 figs. Bimonthly. **DWB**—Each issue (which appears about the 3rd or 17th of the month) consists of a résumé of the preceding months weather and an outlook for the next 30 days. The three charts of (1) observed 700 mb. contours for the Northern Hemisphere, (2) the observed anomaly of temperature (in steps of *much above normal, above normal, normal, below normal* and *much below normal*), and (3) observed precipitation (*heavy, moderate* and *light*) for the United States, provide a means of verification of the prognostic charts issued the previous month. The three prognostic charts, which appear in each issue, are for the same elements and the same class intervals as the 3 charts of observed values, except that all three charts are for the major part of the Northern Hemisphere. On the last page of each issue there are 2 charts of the United States showing the normals and limits (for each first order station) on which the anomalies of temperature and precipitation are based. The rest of the issue is devoted to explanations of the charts, cautions in using, and a description of the extrapolation techniques and other methods employed in preparing these 30-day outlooks. During the four years of issuance (by the Extended Forecast Section under the direction of Jerome Namias) the publication of these outlooks has been restricted to use for scientific or experimental purposes. They are not intended for use at specific places for specific times, but to provide a guide to general trends which are expected to occur over broad areas. The best technical knowledge acquired through years of experience by many researchers throughout the world, and from many schools of thought, have gone into the preparation of these outlooks. *Subject Headings:* **Extended forecasting, Anomalies, Northern Hemisphere, United States.**—*M.R.*

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section, are for information only, and will not be listed in the monthly indexes. When material is furnished in advance of date of publication, the pagination may be omitted.

American Geophysical Union, Transactions, Volume 31, Number 5, Part I, October 1950.

Sherrod, J. S., Neuberger, H., and Yerg, D.: **New standards for Landsberg's glass rod method of integrating ultraviolet radiation,** p. 696–698.

Gilman, C. S. and Weiss, L. L.: **A numerical solution for irrotational flow over a mountain barrier,** p. 699–706.

Hosler, C. L.: **Preliminary investigation of condensation nuclei under the electron microscope,** p. 707–710.

Wiegel, R. L. and Kimberley, H. L.: **Southern swell observed at Oceanside, California,** p. 717–722.

Haurwitz, B. and Panofsky, H. A.: **Stability and meandering of the Gulf Stream,** p. 723–731.

Fries, Carl, Jr. and Gutiérrez, Celedonio: **Activity of Parícutin Volcano from July 1 to December 31, 1949,** p. 732–740.

Miller, Stanley A.: **Some snow-melt runoff characteristics,** p. 741–745. Discussion by Bertram S. Barnes, p. 746–749.

Richards, L. A.: **Laws of soil moisture,** p. 750–753. Discussion by E. C. Childs, E. A. Colman, Willard Gardner, and others, p. 753–756.

Cummings, N. W.: **Minimum evaporation from water surfaces,** p. 757–762.

Holtan, H. N. and Kirkpatrick, M. H., Jr.: **Rainfall, infiltration, and hydraulics of flow in runoff computation,** p. 771–779.

American Geophysical Union, Transactions, Volume 31, Number 5, Part II, October 1950.

Alphabetical and Geographical lists of Members, p. 3–111.

List of Committees, p. 111–114.

List of Publications, p. 115–116.

American Geophysical Union, Transactions, Volume 31, Number 6, December 1950.

Panay, Nicholas T.: **Note on measurements of the films of the solar eclipse May 9–8, 1948,** p. 809–815.

Aslakson, Carl I. and Fickeissen, Omar O.: **The effect of meteorological conditions on the measurement of long distances by electronics,** p. 816–826.

Blanchard, Duncan G.: **The bahavior of water drops at terminal velocity in air,** p. 836–842.

Murray, W. D., Schneider, C. S., and Smith, J. R.: **Development and utilization of constant-level balloons,** p. 843–848.

Hamilton, W. S.: **Forces exerted by waves on a sloping board,** p. 849–855.

Schaaf, S. A. and Sauer, F. M.: **A note on the tangential transfer of energy between wind and waves,** p. 867–869.

Strauss, Fred A.: **The use of a temperature-runoff relationship in water-supply forecasting,** p. 879–884.

Schaefer, Vincent J.: **The formation of frazil and anchor ice in cold water,** p. 885–893.

Foster, Walter Dean: **A comparison of nine indices of rainfall intensity,** p. 894–900.

Discussions.

Wilm, H. G.: **Discussion of "Interpretation of snow surveys" by Walter U. Garstka,** p. 937–939.

Chow, Ven Te: **Discussion of "Annual floods and the partial duration flood series" by W. B. Langbein,** p. 939–941.

American Meteorological Society, Bulletin, Volume 31, Number 9, November 1950.

Tepper, Morris: **On the origin of tornadoes,** p. 311–314.

Williams, Archie F.: **A "Geostrophic Map,"** p. 315–317.

Stevens, Gene C., Fritz, Sigmun and List, Robert J.: **Two halo displays over eastern U. S. in December 1948**, p. 318–321.

Williams, Geo. C.: **Nacreous clouds observed in southeastern Alaska January 24, 1950**, p. 322–323.

Freeman, John C., Jr.: **Map analysis in the vicinity of a pressure jump**, p. 324–325.

Waggoner, Paul E.: **Temperature lapse rates over bare ground and over potato plots on peat and mineral soils**, p. 326–329.

Crain, C. M., and Gerhardt, J. R.: **Some preliminary studies of the rapid variations in the index of refraction of atmospheric air at mirowave frequencies**, p. 330–335.

Parrot, William H., Paquette, Robert G. and Church, Phil E.: **A meteorograph for low altitude sounding**, p. 336–340.

Sittel, Karl and Menzer, Ernest: **An improved fully electric radiosonde**, p. 341–346.

Annalen der Meteorologie, Volume 3, Number 7–8, 1950.

Bintig, Paul: **Der Einfluss des Windes auf die Wassertemperaturen des Ozeans und ihr Zusammenwirken mit der Lufttemperatur. 1. Mitteilung**, [The influence of the wind on the water temperature of the ocean and its connection with the air temperature. 1st report], p. 193–201.

Rodewald, Martin: **Wolkenstrassen über Holstein**, [Cloud lanes over Holstein], p. 202–213.

Bintig, Paul: **Ein auffälliger Starkniederschlag**, [A remarkable heavy rain], p. 213–214.

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